

Division of
Research Grants
National Institutes of Health

*A
Half Century
of
Peer Review*

1946–1996

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**Division of Research Grants
National Institutes of Health**

A Half Century of Peer Review

1946–1996

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Director's Foreword

Among the 24 Institutes, Centers, and Divisions (ICDs) presently comprising the National Institutes of Health (NIH), the Division of Research Grants (DRG) is the second oldest and the most closely tied to the Office of the Director, NIH. Historically, Division activities have been the focal point of the extramural system at NIH — receiving project applications, assigning them to ICDs, organizing review by scientists, managing the information system which tracks awards, and providing assurance to Congress on critical operational concerns. Established as a free-standing organization under Dr. Cassius J. Van Slyke in August 1946, the Division has undertaken a wide range of centralized policy and program functions directly or indirectly related to the grants process. Brought into the Office of the Director in 1969, the Division gradually relinquished certain ancillary functions and in 1995 passed its information management activity to the Office of Extramural Research. DRG's core function, the conduct of grants peer review, currently entails the receipt and referral of 40,000 proposals annually and the merit evaluation of 24,700 grant and fellowship applications by 1770 reviewers in 102 study sections.

To commemorate its 50th anniversary, the Division in October, 1993 commissioned an official monograph history and an interview project for recording the recollections of retired senior staff. These efforts have elucidated a rich and complex legacy in institutional development at the National Institutes of Health. They have also provided insight into the forces and personalities which drove the great expansion in postwar biomedical research, and they have shed a critical light on the problems, opportunities, and achievements involved in managing the Federal biomedical research enterprise. Our understanding of how the peer review process evolved is considerably improved by this historical exercise. It should be noted, however, that the absence of verbatim meeting minutes, as mandated by the Federal Advisory Committee Act and other statutes, has precluded any detailed examination of study section deliberations after 1972.

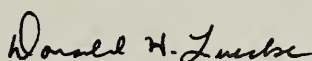
From an administrative standpoint, compiling the Division's history serves several needs. The study gives us a broader understanding of the policy background of technical and procedural issues germane to peer review. In addition, the study illuminates the Division's historical relationship with Congress, the Office of the Director, and the scientific community. Developed over decades, these long-term operational patterns underlie and inform current policymaking. The monograph also serves as a reference text for orienting new staff to the operational environment. It highlights key decisions, details reporting relationships and functional responsibilities, and elucidates the interplay between staff echelons, which sustains operational effectiveness.

What is remarkable about the Division's half-century saga is that, while organization and function have been in constant flux, peer review practices have evolved more gradually. In the first postwar decade, substantial change was the general rule in DRG activities. Study sections utilized a referee system, adopted ratings for applications, and recognized the importance of appointing women as reviewers, while the Division worked out the details for direct grant administration and prepared the first institutional grants. But from 1956 to the Wooldridge Report in 1966, the only procedural change was the gradual emergence of program-project review. The dramatic expansion of the Shannon era brought administrative undertakings in information management, in reviewing large construction grants, administering center grants, designing the career development program and conducting comprehensive post-award management of all Public Health Service (PHS) grants. The third decade saw substantial downsizing of certain administrative functions when the awarding of grants by the Division ceased, and the functions of patent protection, manual issuance, and civil rights and research subject assurance were relocated in the Office of the Director. Yet no changes of comparable magnitude occurred in review procedures until the implementation phase of the Grants Peer Review Study began in 1978. Then the release of summary statements to applicants and the development of a rebuttal and appeals system led to a more tutorial style in study section operations. Over the past 2

decades, the volume of applications and reviews and the number of study sections and consultants have roughly doubled in size. However a constant infusion of procedural improvements has ensured that, as the peer review system grows in complexity, the high quality of merit assessment can be sustained.

Accommodation to changes occurring in the biomedical and behavioral science communities has been the hallmark of the Division's history. It reflects the nature of the close partnership between the Federal Government and the biomedical community, and DRG's special function of providing the interface which gives non-governmental scientists a critical role in shaping the direction of research in this country. It also reflects a leadership style inherited from Ernest Allen and Cassius Van Slyke, whose guiding precept was that no procedural obstacle should be allowed to stand in the way of scientific opportunity. The Division's history has been one of reinvention, a process more fully delineated by the Clinton Administration, and one in which the NIH extramural system has become a laboratory for reinvention activities. Streamlined review, improved referral, and the reorganization of review groups into broader, topical groups are among many innovations currently underway which promise to enhance the Division's performance in the coming years.

The dependence of our work on process-defined activities should not obscure the labors of the DRG staff, who are responsible for what we achieve as an organization. They give to peer review, as Dr. Donald S. Fredrickson pointed out in a review of this manuscript, "a special, precious character. Their contributions tend to be overshadowed by the forces and the discoveries they sustained. Yet they are the pre-eminent pillars of the civilization that strives to leave a legacy of knowledge through an endless process of discovery and utilization of knowledge."



Donald H. Luecke, M.D.
Acting Director
Division of Research Grants

Acknowledgments

Ever since its emergence as a multiplex Federal institution in 1948, NIH has thrived by dispensing most of its annual appropriation to scientific investigators and the universities and medical centers that support biomedical research. The mechanisms for this annual giveaway — currently, 29 varieties of grants and fellowships — are mediated by a unique public/private partnership, which assesses merit and selects the most promising individuals and project proposals for funding. This account chronicles the growth and maturation of that partnership, the NIH peer review system, from the point of view of its primary sponsor and initiator, the NIH Division of Research Grants. Also told here are the stories of a committed coterie of science advocates, civil servants, and research leaders who guided the extramural enterprise in its first half-century.

This volume was intended to fill a void in the institutional memory of NIH. Earlier efforts to compile an official history of the extramural system expired without issue in 1958 and 1961. Subsequently, much documentation was either lost or disposed under record schedules that placed a low priority on historical value. The Anniversary History Project collected all extant inactive DRG records for accession to the National Archives, and it also conducted about two dozen oral history interviews with retired staff. Even with extensive use of files from the Office of the Director, NIH, however, the Division's official record remained incomplete. By constructing a continuous narrative, it was possible to elicit patterns of institutional development that brought coherence to policymaking and evoked the commitment and vision of individual career efforts. Where extent records allowed detailed elaboration of Division activities and decisionmaking, then-current terminology has been retained for organizations and operations, and the original language and intent of legislative enactment and obligation has been respected. Extended

consideration of science issues, including extramural research accomplishments, program evaluations, and the contributory role of extramural grantees — whose aggregate number exceeds 250,000 — remain beyond the scope of the present effort. Likewise, only passing consideration was given to NIH peer review activities conducted by the Institutes. In both cases, separate treatments are in order.

The particular variant of institutional history developed here was shaped by the academic literature on NIH history. Preliminary explorations by Daniel M. Fox, Harry Marx, Donald C. Swain, and Victoria A. Harden generally agree that NIH grew in a climate of political uncertainty and that the success of programs and policies was always problematical. Never preordained or guided by any overarching intelligence, growth was the product of successful brokerage of consensus between scientific communities, congressional committees, and Federal agencies. When the play of historical circumstances could be accommodated to advantage, as in the postwar years and the Shannon era, the institution prospered. When the play of circumstances was adverse, as in the Nixon years and the early 1980s, then institutional continuity became the highest goal. More than any internal dynamic, the history of NIH peer review reflects this continuing readjustment to the external context.

The writing of this volume was in many ways a joint enterprise, and the participation of many individuals needs to be noted. The project was directed by a committee of serving and retired DRG professional staff, who read and revised each manuscript chapter and assisted and guided the research. Dr. Samuel H. Joseloff, Chief of the Office of Grants Information, and Patricia B. Bailey, Chief of the Office of Administrative Management, and Dr. Jerome G. Green, DRG Director until June 1996, kept the writing within institutional purview. Drs. Samuel M. Schwartz and Mischa E. Friedman, former chiefs of the Referral Review Branch, reviewed archival files and

operational materials and provided a vital link with problems at the working level.

Special thanks are due to William Walker, President, Logistics Applications, Inc., and his staff who provided unlimited support and resources throughout the project. As editor, Robert A. Malone of United Information Systems, Inc., designed the volume, moderated the discourse, and improved the text, which was produced by Michele Grandison Smith. Mark Aitken, research assistant, assembled source materials from many repositories, compiled the appendices, and prepared the final drafts. Dr. Victoria A. Harden, Director of the NIH Historical Office, enriched the manuscript with extensive commentaries and unfailingly encouraged the enterprise.

Retired staff members gave generously of their time in oral history interviews and provided important artifacts from their service years. Ernest Allen, David Price, Carl Lindsay, Eugene Confrey, Carl Douglass, and Stephen Schiaffino gave us the inside view of the Division's management. Irvin Fuhr, Harold Davidson, Ileen Stewart, Donald Chalkley, Clifton Himmelsbach, James Haggerty, Irving and Ethel Gerring, Glenn Lamson, Sibyl Griffin, Tom McCarthy, Marion Oakleaf, and Alex Adler provided operational details, and Mischa Friedman furnished us with his personal journal. Sam Silverman allowed us to scan and publish from his extensive collection of study section group photographs. Dina Hamilton, Roger Van Slyke, and Anton Allen helped locate interview subjects, artifacts, and documents. John Sherman and Donald Fredrickson read draft chapters and gave us the benefit of their recollections, and Elvin Kabat recollected the trials of the McCarthy era. A special debt is owed to Dr. Jerome G. Green for opening files, producing sources, acceding to interviews, and energizing the project in innumerable ways.

Division personnel furnished backfiles, memorabilia, and much useful advice. Judy Grover, Robert Moore, Barbara Williams, Nicholas Moriarty, Mary Collins, Katy Woodbury,

Sandy Brouard, and Jean Gunton made information available, as did Drs. Michael Lang, Harold Davidson, Ileen Stewart, Catharine Wingate, Keith Kramer, Marjam Behar, Paul Strudler, and John James. James Pike, Executive Officer, facilitated searches of operational files outside the Division and opened DRG administrative files. Nicholas Suszynski, Information Services Branch (ISB) Chief, shared current materials on IMPAC (Information for Management Planning, Analysis, and Coordination of the Extramural System) migration, and James Tucker, Carol Blakely, Katherine Denikos, Sandy Thananart, and Dr. William McGarvey of ISB were especially helpful in constructing statistical tables, as was Fred Wong, Chief of the Office of Financial Management. The Office of the Director, NIH also facilitated the research. Karen O'steen of the Executive Secretariat secured access to the Central Files; David Porter located a wide range of materials and provided a wealth of background information. Drs. Carlos Caban and Niles Bernick of the Office of Extramural Programs gave us access to the papers of Dr. William Goldwater and the active files of the Review Policy Committee. We are also indebted to Cheryl Seaman of the Office of Administrative Management for organizational files detailing the Division's reporting relationships.

For archival access I would like to thank Aloa South and Marjorie Chiarlante of the National Archives Civil Reference Branch for their help in locating files from the National Institutes of Health, the Public Health Service, and the Office of Scientific Research and Development. Judith Barnes and Carl Hancock at the Washington National Record Center at Suitland, Maryland, and Sue O'Boyle and Johanna Bonnellycke, NIH and PHS records officers, assisted searches of uncatalogued inactive files. Mark Sweeny and Ken Carter guided me through the Library of Congress holdings of Study Section minutes, and photographs were located by Dan Barbiero of the National Academy of Sciences, Lorraine Krause at the University of Utah Library, and

Vicki Sype at the Office of the Secretary, Department of Health and Human Services (DHHS). Will Johnson at the Kennedy Library and John Wilson at the Johnson Library brought new information to light, and Sheila O'Neil, manuscript curator at the National Library of Medicine, allowed us to quote and cite the Van Slyke oral history.

PROLOGUE

“Cooperative Projects”: Grants-in-Aid, Peer Review, and Federal Patronage in Biomedical Research, 1879-1944

Research is always something of an adventure.
The more freedom it enjoys, the more likely it is
to achieve important results.

National Resources Committee,
Research—A National Resource, 1935

The extramural research system of the present-day National Institutes of Health is rooted in two separable features of the Federal health experience in the half-century leading up to World War II. The more general feature, grants-in-aid, was primarily political in character, an institutional interaction between Federal authority and a decentralized political system that contributed significantly to the pluralism of American public health. The more specialized feature, grants peer review, was largely science-based, a consensual relationship within scientific communities that governed the development of fields of medical knowledge and clinical practice.

As evolving Federal institutional functions, grants-in-aid and grants peer review developed distinctly different centralizing tendencies after 1900, reflecting the rush of scientific modernization and cultural demands for sanitation control, health reform, and protection from infectious and chronic disease.¹ Committed to establishing a national health agency, the leadership of the Public Health Service (PHS) utilized Federal-State matching

grants after 1918 to overcome the Federal Government's reluctance to sponsor scientific research.² When Federal research patronage began operating during World War II, peer review provided an essential mediative function between academic research communities and the Federal sponsor. The different development patterns of reviewing and granting were deeply interwoven into the "culture warp"³ from which Federal biomedicine emerged in the immediate postwar era.

From its inception, the institutional context of American biomedical research was adverse to centralized direction and control. The earliest Anglo-American establishment of journal peer review, the 1665 charter of *Philosophical Transactions* by the Royal Society of London, came out of the European tradition of court-centered science. By 1752, the Society had set up a "Committee on Papers" to review submitted manuscripts and assign credit for scientific discoveries.⁴ As learned societies developed in the American colonies and the early Republic, however, these functions were locality-based. A modicum of editorial standard-setting in scientific journals can be discerned by 1863, with the founding of the National Academy of Sciences, but most medical journals were run exclusively by editors without recourse to peer review.⁵

A much stronger dynamic characterizes the development of the grants function in the 19th century. Beginning with the Northwest Ordinance of 1787, the Federal Government used land grants to redistribute 250 million acres of public domain to the States. Federal disbursements to the States also included cash grants; the Treasury distributed its 1835 surplus on this basis. The Morrill Act of 1862 granted extensive tracts of Federal land to the States to establish and operate colleges, and statutes passed in 1868 and 1879 authorized grants to the States for housing disabled veterans and educating the blind.⁶ Regulatory controls originated with the Hatch Act of 1888, which authorized annual subsidies for agricultural experiment stations and set up a Federal

supervisory office that claimed the right to set lines of inquiry and to select research results for publication.⁷ By integrating its administration with the experiment stations and by sponsoring cooperative research projects at the State level, the Agriculture Department used this early experience with centralization to take the leading role among Federal science agencies.⁸

Research in medicine and the natural sciences lacked both organic connections with Federal policy and significant support from private benefactors. After the 1878 yellow fever epidemic in the lower Mississippi Valley, field investigations by the Marine Hospital Service (MHS), forerunner to the Public Health Service, were funded by an eccentric New York philanthropist, Elizabeth Thompson, after Congress refused the appropriation request.⁹ Both the National Academy of Sciences and the American Academy of Arts and Sciences dispensed small research grants after 1875, but the cumulative value by 1900 was less than \$100,000. Private endowments for scientific research totaled \$3 million by 1903, a paltry sum next to the \$153 million bestowed on colleges and universities for general education.¹⁰ During 1879 to 1883, Congress experimented briefly with a centralized health agency, the National Health Board, which granted \$30,000 for yellow fever research to university faculty. Apart from making the country's first governmental grants for medical research, the Health Board was also a threshold experience in expert review. Composed of seven nongovernmental experts from different States and four Government members, the Board attempted to exercise both advisory and executive responsibilities, but lacked the requisite authority for either task.¹¹

After Congress proved unwilling to fund a second experiment in centralized health administration — the “Department of Science” proposed by the Allison Commission in 1885 — the Marine Hospital (MHS) Service bid for and won the leading position in emergent Federal biomedicine. Legislation enacted in 1890 and 1893 conveyed authorization to prevent epidemics and

to cooperate with local and municipal health departments, whose diagnostic and vaccine laboratories were at the forefront of the revolutionary new science of bacteriology.¹² More weighty enactments in 1901 and 1902 followed vigorous efforts by MHS bacteriologists fighting epidemics of plague in San Francisco and Hawaii and yellow fever in Cuba. The MHS Hygienic Laboratory was enlarged and given the national role of “clearinghouse” for scientific information, while the Service’s Surgeon General was authorized to coordinate State public health efforts. An advisory board of four public health experts and three Federal counterparts was charged with “the coordination of scientific work” in industrial and university laboratories.¹³

Most of this authority went unused in the ensuing decade, as the renamed Public Health Service developed its epidemiological focus and a complementary research specialization in noncontagious diseases and stream sanitation.¹⁴ Private foundations dominated the educational landscape and basic medical research. At the Rockefeller Institute and the Carnegie Institution of Washington, both founded in 1902 with ample endowments, patronage was largely in-house, although there was a generally disappointing experience with “minor grants” to exceptional researchers. Foundation programs notably lacked a selection process separable from the institution’s trustees. More modest granting efforts in the same decade by the American Medical Association’s Committee on Research proved more durable, in part because selection was entrusted to volunteering professionals in the field.¹⁵

Federal mobilization for World War I broke basic biomedical research out of this pattern and gave new impetus to old dreams of centralized health research. In 1916, the Wilson Administration persuaded Congress to charter the National Research Council (NRC), so that appropriations for scientific or “Military-Medico” projects could be bid out to academic researchers in the form of contracts.¹⁶ The NRC Medical Division consisted of 15 represen-

tatives of scientific societies plus 6 or 8 at-large members, with special committees of outside experts called in to make awards, adjust budgets, and administer projects. The reviewing arrangement represented considerable evolution, because initially the Council followed traditional practice in allocating only to the most seasoned investigators. By war's end, however, the committees were sifting through "the inventions and suggestions of inexperts" in order to find the rare individuals likely to make unexpected discoveries.¹⁷ An Executive Order in May 1918 extended the NRC into peacetime and established the Council as a permanent advisory body for the Federal Government. From an annual budget of about \$800,000, the Council dispensed about 140 fellowships and, after 1930, developed a small grant program. The former was held to be a more valuable asset to the universities than the much higher level of equipment underwriting supplied by other foundation funds during this period, and both pioneered peer review procedures, which were distinctly lacking in the foundation experience.¹⁸

What catalyzed the grant function was the enormous upsurge in grants-in-aid for relief and recovery programs, which are the enduring hallmarks of the New Deal era. After the business crash of 1929, the foundation funding that had supported academic research expansion during the 1920s contracted precipitously, along with the State revenues upon which land-grant universities had come to depend.¹⁹ Activist university leaders, such as Karl Compton of the Massachusetts Institute of Technology (MIT), joined NRC traditionalists, who had lost industrial funding in the Science Advisory Board (SAB). An official public lobby, the SAB in 1934 sought congressional approval for \$5 million annually in research grants for private universities to help restart the economy.²⁰ Although the SAB lost its major gambit in a dispute with the rival community of social scientists, an SAB subcommittee, chaired by the PHS Surgeon General Thomas Parran, got action on a similar proposal for \$2.5 million annually

in public health research authorization in the 1935 Social Security Act, along with \$8 million in annual grants for State public health services and training. The major provisions of the 1935 Act provided matching grants to States for three types of needy individuals, and reimbursed unemployment expenditures were projected to reach \$500 million by 1940.²¹

Assistant Surgeon General Lewis R. Thompson, Chief of the Division of Scientific Research, PHS, initiated extramural granting in 1935, soon after enactment of the Social Security Act. Granting authority had been vested in the National Advisory Health Council (NAHC) at its creation in 1930 by the Ransdell Act, which transformed the Hygienic Laboratory into the National Institute of Health (NIH). Thompson disliked the idea that the NIH Director or his deputy was to present grant applications to the Council. At the 1935 NAHC meeting, Thompson asked,

Would it be better to have subcommittees established in more narrow fields of work composed entirely outside the Service, who would recommend approval or disapproval based on scientific worth?²²

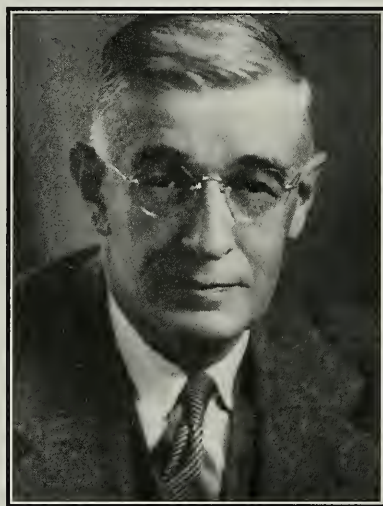
In the following year, Thompson's report listed 5 cooperative projects worth \$27,240 at the end of 50 pages describing intramural programs. The Roosevelt Administration concurred that the Government should transfer most Title VI funding allocated under the Social Security Act to leading universities. At the May 1937 NAHC meeting, the Council approved \$31,520 for new projects and voted to keep "cooperative projects" awards between the Service and individual investigators and to require matching funds from institutions that sponsored the investigators.²³

The role of universities in the unfolding pattern of Federal research patronage became clearer in 1937, when Congress enacted the National Cancer Institute (NCI) bill, and SAB's successor, the National Resources Committee, began drafting a detailed national research strategy. The NCI bill created the

National Advisory Cancer Council (NACC) to make research grants-in-aid, to recommend projects for research, and to "collect information as to studies." Congress thereby undertook to build an advisory structure outside the National Academy of Sciences, which land-grant universities distrusted as too elitist and restrictive.²⁴ The National Cancer Institute Act (PL 244) expanded PHS operating responsibilities by authorizing research fellowships in cancer studies and radium loans to hospitals and university medical centers for cancer suppression. Also, as a granting institution, the new NCI, like the NACC, undertook to limit the expansion of intramural research activities in order to facilitate the funding of university laboratories. The issuance of extramural grants began during 1938-1940, when 137 applications were received and \$200 million was awarded to researchers outside NCI.²⁵ A distinctive review mechanism for cancer grants emerged at this time, with internal laboratory chiefs reading and passing on applications. Moreover, to avoid "spot giving" and to ensure long-term continuity between projects, the program allowed cancer specialists at NCI to choose projects that complemented ongoing laboratory work. Thompson's larger aim was to keep the grant system immune from bureaucratic control. According to the National Resources Committee, extension of responsibility for project review was a further step in this direction, "testing how far existing agencies such as national councils can be used to expand the scope of scientific inquiry and coordinate research."²⁶

In the summer of 1940, the German conquest of France precipitated a general mobilization crisis in the United States. The Roosevelt Administration used the National Research Council and its research networks to bring the scientific community quickly to national service. The problems of mobilizing technology for war, including the nascent atomic fission project, required far wider participation by scientists than existing traditional research networks could support. To create direct linkage between leading science centers and the armed services, President

Roosevelt set up the National Defense Research Committee (NDRC) under Vannevar Bush, president of the Carnegie Institution of Washington.²⁷ Other members included Harvard President James Conant, MIT President Karl Compton, and NRC President Frank B. Jewett. For 12 months, the Committee provided technical advice to the War and Navy Departments and let contracts for crash production projects, the largest of which went to MIT's radiation laboratory for radar development. Charged also to "supplement this activity by extending the research base," the NDRC compiled an index of 700 academic institutions with facilities and investigators identified for future contracts.²⁸



1. Dr. Vannevar Bush, Director, Office of Scientific Research and Development, 1941 – 1946. Courtesy of the National Academy of Sciences.

To activate this larger research network, the Committee in June 1941 created a temporary umbrella agency, the Office of Scientific Research and Development (OSRD), through which about 2,515 contracts worth about \$453.7 million were let and administered by war's end.²⁹ Also chaired by Bush, OSRD



2. Committee on Medical Research, Office of Scientific Research and Development.
Courtesy of the National Library of Medicine.

supplanted efforts by congressional friends of State universities to distribute Federal bloc grants to laboratories geographically, without benefit of program or review activities.³⁰ Bush insisted on the contract mechanism and results-oriented directed research as the only *modus operandi* appropriate for wartime. Two complex hierarchies of committees were set up to negotiate contracts, ensure quality of research design, administer awards, and review programs and budgets. Responsibility for research operations was divided between a new Committee on Medical Research (CMR) with five divisions and a downsized NDRC with four divisions. Parts of the reviewers' function were delegated to parallel divisions of the National Research Council, whose members passed on the merits of contract proposals and also, as individuals, staffed the OSRD working committees. As the primary operational units, the OSRD divisions formulated programs, proposed contracts, and established cost limits subject to semiannual review by the major committee.³¹ Within their respective medical and physical science fields, CMR and NDRC had responsibility for "advocacy," "directing," and "reviewing," while the NRC subcommittees served as "filtering bodies."³² In contemporary terms, the NRC

committees provided the CMR with peer review of project proposals, the first sustained, large-scale exercise of that function in a biomedical context.

CMR research activities steadily expanded from 1942 to 1944, as funding rose from \$2.3 million to \$7.5 million. CMR reliance on NRC advice evolved into an early variant of dual review, which originated with Bush's determination in January 1942 that tactical evaluation of NDRC-developed radars be conducted by scientists outside the development process, "for they should make an utterly unprejudiced approach."³³ Through the end of 1945, NRC committees reviewed 951 proposals for contracts, recommending 313 for disapproval and rating 638 as "A," "B," or "C." CMR meetings became preoccupied with evaluating these contract proposals and yielded a generally positive result — 501 affirmations (78.5 percent). Reimbursement of NRC reviewing expenses was arranged through a separate CMR contract.³⁴ Likewise, in the spring of 1944, the program function came to rest entirely within CMR, after passing from NRC Division chairmen to a committee of CMR Division chairmen, who were preoccupied, to a designated CMR scientific officer, who kept in direct contact with individual contractors and who could initiate Division reorganization as needed.³⁵

When the CMR reorganized in June 1944, a pattern of mushroom growth in research activities was clearly evident. The new CMR contained 6 divisions with 10 subcommittees, while the NRC Division of Medical Research had 13 committees, 43 subcommittees, and 534 members, most of whom also held CMR staff assignments. Twenty-one penicillin production plants, the foundation of a major postwar industry in antibiotics, were ready to begin operations, and the Committee could claim credit for other therapeutic advances, which increased the survival rate of wounded soldiers to 97 percent.³⁶

Eager to extend wartime cooperation into the postwar years, the CMR leadership — Dr. Alfred N. Richards, chairman; Dr. Lewis H. Weed, vice-chairman; Dr. Alphonse R. Douchez; Dr.



3. Advisory Committee in Pathology, National Research Council, 1942.
 Courtesy of the National Library of Medicine.

A. Baird Hastings; Brigadier General James Simmons; Rear Admiral Harold W. Smith; and NIH Director Rolla E. Dyer — were preparing a major research and development program for streptomycin and nationwide clinical trials for penicillin therapies for syphilis.³⁷ At the same time, however, Vannevar Bush was taking the parent OSRD organization along a very different path. By early August 1944, Bush had decided to transfer most ongoing OSRD work to the military services upon the collapse of Germany, then projected for the autumn of 1944. Bush was willing to allow a modicum of OSRD contracts to be transferred to “a permanent civilian organization which might in peacetime supplement the work of the Army and Navy,” but his priority was to demobilize as quickly as possible and release scientific personnel to their prewar civilian employment.³⁸

What dissuaded Bush from his initial concept of a postwar military-civilian research agency was the unwillingness of either service to take up the considerable personnel requirements of the OSRD contract system and the Army’s view that war against Japan would continue through 1946, with enormous casualties and attendant medical cost.³⁹ In November, Bush obtained authorization from Roosevelt to restudy the problem of postwar research

from a civilian perspective. Before this effort got underway, however, Surgeon General Parran and NIH Director Dyer opened a campaign to attach ongoing CMR programs to NIH. The PHS effort began with enactment of Public Law 410 on July 5, 1944. This legislation consolidated control of the PHS research grant system under the Surgeon General, empowered the National Advisory Health Council and the National Advisory Cancer Council to recommend projects for funding, and also accorded the Surgeon General "such additional means as he deems necessary or appropriate" to administer grants.⁴⁰ On August 29, Dyer proposed that the CMR and its NRC reviewing bodies be transferred to the control of NAHC, which would then assume OSRD's responsibilities under the PHS field grants system.⁴¹ Dyer's takeover proposal, which would have transformed CMR administrators into PHS consultants and staffed a new nationwide research network with PHS fellows, demonstrated the wide reach of PHS authority under PL 410. "The system at present use would not have to be changed," Dyer emphasized, but in fact PHS would have assumed the client-user role that the military services had constructed over the war years. The gambit was blocked when the Bureau of the Budget disapproved a \$7 million earmark in the 1945 appropriation, but the CMR did accept Dyer's proposal at a September 21, 1944 meeting.⁴²

The process of closing down the wartime research enterprise would continue through the summer of 1946, but the effects of the OSRD/CMR experience, as well as the direction of postwar developments, were clearly delineated at the close of 1944. Federal patronage in biomedicine was firmly established, and medical research had become a vital prerequisite for developing the national health care system.⁴³ Moreover, project review by peers had proved effective as a means of bringing together the diverse interests of scientific investigators, academic institutions, Federal policymakers, and user agencies.

For the generation of biomedical scientists and science administrators who brought NIH and its extramural system to maturity in the postwar decades, the wartime experience left a critical legacy. Although the project grant system had originated a decade before the war in the Rockefeller Foundation,⁴⁴ the first NIH extramural administrators incorporated key features of the CMR/NRC system in postwar grants policy and procedure. In terms of operating principles, review by experts and the separation of program management and review functions became hallmarks, as well as service without compensation (except for per diem allowance) for consultants. Numerous review practices also grew out of the wartime experience. Rules requiring a consultant to absent himself from discussions or voting on proposals affecting the institution that paid his salary and the practice of grading applications according to a fixed scale originate in OSRD/CMR practice.⁴⁵ Structural features grafted onto the postwar grant institution include special grants to review groups to cover operating expenses; appointment of military liaison members in the study sections; and use of the title, "Executive Secretary," which in the wartime context was held by the CMR's chief administrative officer. In sum, the Committee on Medical Research provided PHS planners with an essential prototype for postwar peer review.

Mandate for Biomedical Research: The Awards Experience, 1945-1950

The only possible source for adequate support of our medical schools and (medical) research is the taxing power of the Federal Government. Public and private agencies agree that this is so. Likewise, all groups — including Federal agencies and the drafters of legislation — agree that such a program must assure complete freedom for the institutions and the individual scientists in developing and conducting their research work.

Surgeon General Thomas Parran,
lecture, Dartmouth College,
December 1945

*F*or NIH in general and the nascent extramural program in particular, the immediate postwar years were a period of unique opportunities and recurring dilemmas.¹ To convert military medical research to peacetime basic science, the largely intramural NIH had to be transformed into a Federal research patron with major extramural responsibilities nationwide. In this collaborative exercise with the White House, congressional committees, and newly demobilized civilian scientists, the PHS could count on no sure or steady successes. Five years of overheated investment and fast-paced, expedient research projects during wartime had significantly raised the level of dissonance in what had always been a pluralistic research economy.² Moreover, the distribution of resources and rewards distinctly favored the military services, which emerged from the war mobilization with

the lion's share of research appropriations, as well as possession of the major governmental laboratories and the allegiance of leading academic research centers.³

These disadvantages made the development of an NIH grants system an unlikely prospect. Vannevar Bush, head of the wartime Office of Scientific Research and Development (OSRD) and the leading scientific spokesman of the postwar era, sought to transfer the entire OSRD research portfolio to the prospective National Science Foundation. What neutralized these disadvantages for NIH was Vannevar Bush's inability to achieve consensus among scientific and governmental constituencies for a decentralized Federal research structure that would have subsumed the embryonic PHS grants program.⁴ As a scientific visionary, Bush provided an invaluable framework for Federal intervention in the research economy. It remained for others, however, to find appropriate and durable mechanisms for Government/private sector interaction. By carefully nurturing the peer review process and by cultivating rapport with Congress, Surgeon General Parran and NIH Director Dyer won the allegiance of a substantial majority of academic scientists and laid the institutional foundations for the nationwide extramural structure that would emerge in the following decade.

1.1

Leap of Faith: Transferring the OSRD Contracts, April 1945 – January 1946

In spring 1945, as the end of the war in the European theater approached, OSRD began preparations to close down operations. The Committee on Medical Research (CMR) kept about 225 contracts worth \$2.5 million funded through year's end. Thereafter, "fundamental" projects "of the greatest potential public benefit" were to be transferred with funding through June 30, 1946, to other Federal agencies.⁵ NIH projects in antimalarial

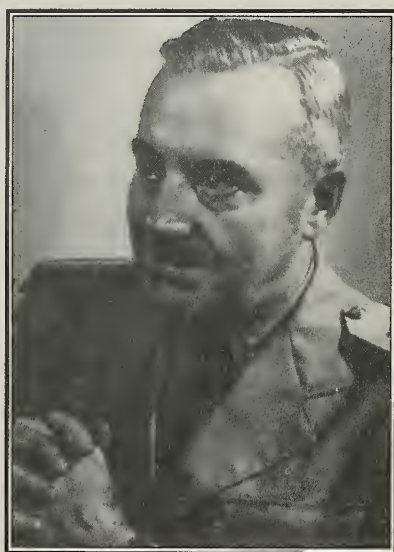
testing and penicillin therapy for syphilis were included, but the great majority of contracts were held by private universities.⁶

Most of the remaining CMR contracts were to have been earmarked for the putative National Research Foundation, which Vannevar Bush publicly proposed on July 19, 1945, but for an internal dispute between Bush and the CMR advisory panel on postwar research, headed by Walter W. Palmer. Intensely opposed to Federal control of medical research, the Palmer panel agitated for a separate foundation for medical research, autonomous from both the natural sciences and any “complex organization for dispensing medical care, hospitalization, or other practical and essentially social measures.”⁷ Palmer’s intent was to deny PHS any role in peacetime medical research. This point of view persisted among medical school representatives in the CMR organization despite the concerted opposition of Bush and the CMR Executive Committee, who realized that Congress would never allow Federal research funding without political oversight and operational participation by Federal agencies.⁸

In taking the opposite position — that medical research was inseparable from both treatment and education — PHS made a strong case for postwar science leadership. PHS staff had doubled during the war years, and nationwide control programs in venereal disease, tuberculosis, malaria, and typhus widened acceptability for grants-in-aid by congressional committees and recipient State governments.⁹ By April 1945, a PHS postwar planning section was mapping out a massive expansion in hospital construction, utilizing matching grants. The Service was administering grants for training 110,000 student nurses and had introduced an embryonic medical fellowship program.¹⁰ Bills were pending in the summer of 1945 to sponsor dental research and mental health research as part of control and construction programs.¹¹

When the postwar program was previewed at the June 1945 meeting of the National Advisory Health Council, Surgeon General Parran placed great importance on “strengthening the

grants-in-aid research program.” He indicated that while accepting the framework of the new foundation, the PHS would “make our own decisions and develop our own programs.” Among the Council’s recommendations was a determination to develop clinical research and “seek appropriations under authority of Public Law 410 (sec 301a) for grants-in-aid for general research, to be allotted to qualified institutions and individuals.”¹²



4. Surgeon General Thomas Parran.
Courtesy of the National Library of Medicine.

The June NAHC meeting inaugurated the PHS postwar research program by approving the first extramural grant application to use PL 410 authorization. At the request of NIH Director Rolla E. Dyer, Senator Elbert Thomas (D-Utah), a strong supporter of Parran’s program on the Labor and Public Welfare Committee, had attached to the FY 1946 PHS appropriation a \$92,000 grant for Dr. Maxwell M. Wintrobe of the University of Utah to study inherited characteristics of muscular dystrophy

among Mormons.¹³ Thomas agreed with Budget Director Harold D. Smith that Bush's program was infeasible and that the Truman Administration would have to craft a different solution for postwar research, one that relied upon existing agencies and accommodated both Federal control and scientific autonomy.¹⁴

On July 19, the Bush report was published as *Science — the Endless Frontier*, and Senator Warren G. Magnuson simultaneously introduced a bill providing for a \$500 million National Research Foundation. Thereafter, the question of scientific centralization dominated research policy planning. Parran took a strong stand, arguing in an August 18 circular to the NAHC, "Congress has given the Public Health Service all the authority necessary to carry out all the suggestions made in the Bush report."¹⁵ Although he disagreed with programmatic details, such as Bush's preference for contracts over grants and the pre-eminent status reserved for academic medicine, Parran accepted his concepts of investigatorial freedom and the necessity for massive Government investment in science as a congenial framework for postwar PHS expansion.



5. Dr. Maxwell M. Wintrobe. Founder and first director of the Utah School of Medicine, Dr. Wintrobe was awarded the first major NIH extramural grant of the postwar era in July 1945. Courtesy of the University of Utah Library.

The problem was chiefly with the implementing bills. Magnuson's measure, drafted by the OSRD staff, excluded Government agencies from research management, and Senator Harvey Kilgore's populist alternative subordinated private and Government research alike to a special authority. Parran's staff feared that the PHS would

lose autonomy under either bill. The Bush report actually recommends that the proposed foundation serve as an advisory committee to the Budget Bureau. There would then be a layer of university professors, whose institutions were competing for research funds, between NIH and the Budget.¹⁶

After discussing alternative options, including termination of extramural interests, the Council rejected an active role in the proposed Foundation and voted to expand both PHS extramural grant activities and the NIH intramural program. To implement this expansion, the NAHC also approved grants totaling \$807,409 for OSRD contracts transferred to the PHS effective January 1, 1946, plus three new applications for \$24,000.¹⁷ Authority came not from a new act of Congress, but from the basic PHS enabling act, PL 410, which empowered the Surgeon General to "make grants in aid to universities, hospitals, laboratories, and other private institutions, and to individuals."¹⁸ For its public position, the Council moved to endorse the Bush report in principle while calling for new implementing legislation embodying "cooperation of all groups concerned as distinguished from 'direction' and 'supervision' by the proposed Foundation."¹⁹

By accepting 42 OSRD contracts as grants, PHS activated the new line of research funding authorized in PL 410 and positioned itself to assist the multitude of demobilized civilian scientists who found themselves without research support at war's end. To handle grant administration duties, NIH Director Dyer set up a small administrative section headed by Dr. Cassius J. Van

Slyke, Senior Surgeon from the Venereal Disease Division, then convalescing from a coronary.²⁰ Van Slyke in October 1945 began writing regulations wherein the PHS would exercise “only the most minimal supervision” over grantees. Responsibility for technical review of grant applications would be delegated to advisory panels drawn from universities and medical schools.²¹ The first of these panels to be formally constituted was the Syphilis Study Section, formerly the OSRD Penicillin Panel, which Parran renamed on December 29.²² Van Slyke also drew up a budget of \$43,928 to administer grant accounts, thereby stretching the \$24,645 contained in the budget supplemental, which Truman sent to the House on October 25.²³

By year’s end, an increasingly rancorous debate in Congress



6. Dr. Cassius J. Van Slyke, Chief, Research Grants Office, January – August 1946, and Chief, Research Grants Division, 1946 – 1948; Director, National Heart Institute, 1948 – 1952; Associate Director, NIH, 1952 – 1958.

about implementing the Bush report had drawn the attention of the Nation’s scientific community. Convinced that it alone could stimulate new research and find the right mix of research

autonomy and political control, PHS was quietly laying foundations for the “cooperative enterprise,”²⁴ which would fulfill the diverse expectations raised by *Science — the Endless Frontier*. By creating a program of extramural research grants, PHS projected the wartime mobilization into the postwar era and advanced its own candidacy for leadership of Federal biomedical research.

1.2

Cassius Van Slyke, Ernest Allen, and the Research Grants Office, January – July 1946

The formal function of extramural grants administration began on January 1, 1946, when the NIH Research Grants Office (RGO) opened with Dr. Van Slyke as Chief and Ernest M. Allen, his deputy from the Venereal Disease Division, as Assistant Chief.²⁵ With borrowed U.S. Army furniture and one secretary, Van Slyke and Allen set up shop in Room 301, Building 1, “pending availability of permanent quarters on the First Floor.” A grants protocol was already in place, and members of the first study section (Syphilis) had just accepted their appointments. Initial work at hand for the skeletal RGO consisted of ordering 12,500 copies of a four-page “Application for Grant for Research Project,” abstracting the first eight grant applications for review by NAHC members, and recruiting a full complement of personnel.²⁶ Allen’s responsibilities included liaison with the Food and Drug Administration and the National Research Council to ensure availability of streptomycin and penicillin for extramural and intramural investigations. Van Slyke and Dyer’s energetic deputy, Norman Topping, visited laboratories and medical schools to stimulate interest in the new grant program, with the result that by March 1946, new applications were being received “almost daily.”²⁷

The immediate impetus behind the surge in grant applications, which continued building through the next fiscal year, was an \$800,000 special congressional appropriation for antibiotics procurement. Clinical and laboratory investigations of antibiotics



7. Syphilis Study Section, 1947. At far side of table, from left: T. J. Bauer, Executive Secretary; Dr. J.E. Moore, Chairman; Dr. J.R. Heller, NCI; Dr. F. Reynolds, Executive Assistant.

had been the leading focus of grant activity since 1945, and the interest in applied clinical therapeutics was enhanced by ready access to the OSRD library of 14,000 experimental biologics, which NIH inherited in 1946. Centralizing purchase and distribution in the RGO, as well as a sharp drop in the price of penicillin, realized substantial savings.²⁸ Since 26 of the first 42 investigations transferred from OSRD involved penicillin therapy for syphilis, the Syphilis Study Section was the first initial review group to organize and conduct meetings. Chaired by Dr. J.E. Moore of Johns Hopkins, the study section's opening meeting on February 7-8, 1946, heard progress reports and declared two penicillin fractions ineffective against syphilis.²⁹ Since ongoing clinical studies employing penicillin required immediate re-evaluation, the PHS convened a Penicillin Conference on March 26-27 to secure the cooperation of drug manufacturers and to establish a second review group, the Antibiotics Study Section. With Dr. Van Slyke as Executive Secretary, the Antibiotics Study Section served as a "central office" to procure, test, and distribute antibiotics and to

advise grantees and veterans hospitals on related clinical problems.³⁰ Supply conditions improved, and the May 10-11, 1946, NAHC meeting approved 19 investigations for penicillin in syphilis for FY 1947, totaling \$476,046. Van Slyke also reported a “surprising total of 104 applications received and reviewed.”³¹

Spring 1946 also saw a quickening in the administrative life of the extramural program. Preparations began in March to field study sections on malaria and rat control, and the March 8-9 NAHC meeting formally approved the study section concept for “more intensive review” before Council meetings. Study sections were formed of leading non-Federal specialists, with ranking PHS officers assigned as executive secretaries and with military representatives for each service for liaison purposes — a vestige of the OSRD experience. Provisions to hire 150 consultants for 13 days a year at \$25.00 per day were hastily added to the FY 1947 budget estimate, along with an additional RGO complement of two research analysts, one budget analyst, and nine secretaries and typists.³²

To begin standardizing the review process, Parran delegated to the NIH Director authority to make grants approved by the Health Council, and the May 10-11 Council meeting established six disposition actions for pending applications.³³ To establish working guidelines for project applications, a policy channel was opened to the office of Mary Switzer, Assistant to the Administrator of the Federal Security Agency (precursor to the Department of Health, Education, and Welfare), and a close counterpart to the Assistant Secretary for Health in later decades. In answer to Switzer’s March 18 call for detailed examination of problem areas in the administration of awards, Dyer and a select staff group decided to limit overhead charges to 8 percent, assess bed costs on the merits of each application, and stimulate research at secondary universities, which had not held OSRD contracts. Dyer’s group also delineated a cluster of six fields (pathology, physiology, biochemistry, pharmacology, bacteriology, and experimental therapeutics) for priority in funding new sections and

stimulating new research. Commitment was also given to stretching the grant period out to a limit of 5 years, to provide a more stable environment for long-term research.³⁴

Largely in response to Switzer's probe, Dr. Van Slyke presented a revamped study section program at the June 14, 1946, Council meeting. Ten sections were listed as "appointed and serving," with another two in progress. Allowance was made for imminent formation of an additional 6 study sections, for a total of 18. The Council also recommended that each chairman be allotted \$2,000 for "implementing and correlating research activities in their respective fields."³⁵ According to a roster of consultants dated August 7, 1946,³⁶ the active study sections were:

| <u>Study Section</u> | <u>Executive Secretary (US PHS)</u> |
|--------------------------------|-------------------------------------|
| Antibiotics | Dr. C. J. Van Slyke |
| Biochemistry and Nutrition | Senior Scientist Floyd S. Daft |
| Cardiovascular | Senior Scientist Mark P. Schultz |
| Dental | Dr. H. Trendly Dean |
| Hematology | Dr. Kenneth M. Endicott |
| Malaria | Dr. G. Robert Coatney |
| Pathology | Dr. R. D. Little |
| Physiology | Dr. William H. Sebrell |
| Virus and Rickettsial Diseases | Senior Surgeon Norman H. Topping |
| Syphilis | Dr. C. J. Van Slyke |

This first cohort of executive secretaries was distinguished both by their concurrent positions within NIH, as well as by their subsequent service at the Institute Director level. Dr. Van Slyke was already in the process of assuming his duties as Director of the National Heart Institute. Dr. Daft became Director of the Arthritis Institute in 1953. Dr. Dean directed the Dental Institute from 1948 to 1953. Dr. Endicott headed the National Cancer Institute from 1960 to 1969. Dr. Sebrell served as NIH Director from 1950 to 1955, and Dr. Topping was NIH Associate Director from 1948 to 1952.

Assisted by these review groups, the Council approved 129

applications for \$2,079,695 by June 30, out of a total FY 1947 allotment of \$2,877,778. Awards were signed by the Chief, DRG as "Executive Grants Officer," while the grant-in-aid was conveyed by the Director, NIH on the authority of the Surgeon General. With pending applications for \$405,720 awaiting the September Council meeting, Van Slyke began preparing a supplemental budget request, as the pace of grant activity was roughly double what he had expected at the start of the year.³⁷

1.3

New Horizons: The Division's First Year, August 1946 - August 1947

The catalyst for a year of growth that brought division status, organizational complexity, and comprehensive program responsibility to Dr. Van Slyke's organization was passage of the National Mental Health Act (PL 487) on July 3, 1946. Viewed by Parran's planners as a model for other categorical institutes, PL 487 authorized \$10 million in State grants for mental health facilities and research projects. It was "the first permanent legislation authorizing grants to educational institutions," the PHS *Annual Report* noted, and the first major commitment to train health manpower.³⁸ Anticipating a quantum jump in grant activity, the Office of the Surgeon General convened a special committee representing the five PHS divisions with research grant authority to achieve a servicewide "correlation of administration." The committee recommended centralizing application processing, the audit function, and information services for all PHS divisions in the Research Grants Office (RGO). Although care was taken to lodge survey and review functions with the divisions, RGO was authorized to pay all grant awards, to assist grantees in procuring critical supplies, and to "provide secretarial or dictaphone service for special consultants and executive secretaries."³⁹

Confident that Congress would soon double the Fiscal Year 1947 research grant appropriation, Dyer applied for division status

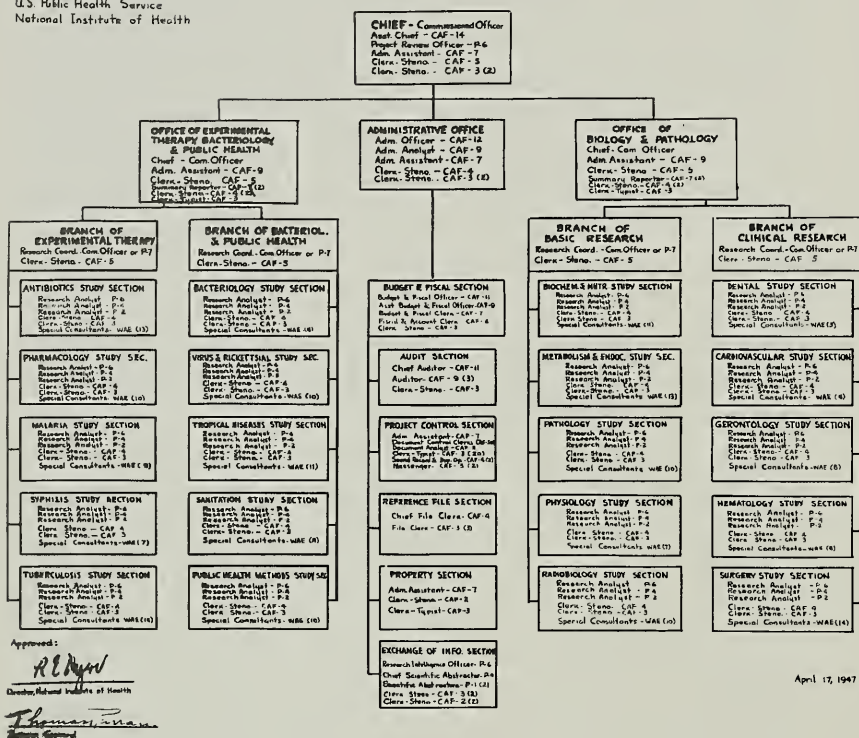
for RGO and had Van Slyke draw up a new table of organization containing 102 positions, twice the then-current complement.⁴⁰ Van Slyke also drafted Federal Security Agency (FSA) General Circular #100, dated August 12, which transformed the RGO into the Research Grants Division and charged it with “administrative supervision over all programs of grants-in-aid for research which are conducted by the Public Health Service.” Designated award functions included receipt, technical review, presentation at Council, and post-award processing, as well as auditing and progress evaluation. Van Slyke also drafted FSA General Circular #102, dated August 20, which made the Division responsible to the National Advisory Cancer Council and the National Mental Health Council, as well as to the National Advisory Health Council.⁴¹ The staff expansion for the new Division took place within T-6, a two-story temporary building for laboratory and administrative offices that had housed as many as 500 wartime workers since 1942. Executive offices in T-6 occupied by the Office of Surgeon General became vacant after January 1946, when the PHS reclaimed its headquarters on Constitution Avenue in downtown Washington. Staff expansion continued through 1947, with an additional 58 positions showing on an April 1947 organization table. In addition to large staff sections for auditing



8. Building T-6, 1947. Wartime headquarters of the Surgeon General, this temporary structure housed NIH offices and laboratories. DRG shared space here with as many as six Institutes during 1946–1961.

Federal Security Agency
U.S. Public Health Service
National Institute of Health

RESEARCH GRANTS DIVISION



9. DRG Table of Organization, April 1947.

and information services, the fully deployed organization now backed each study section with a support section of five analysts, recorders, and secretaries.⁴²

Van Slyke's scientific objectives for the emerging organization were far-reaching. As popularized in a widely circulated *Science* article in December 1946, Van Slyke intended the study sections to formulate independent program guidance on "restocking and enlarging the storehouse of fundamental data" while protecting investigators' "absolute freedom from control, direction, regimentation, and outside interference." "New nuclei of

research” would be cultivated in smaller universities and underserved areas, and the Division would set up a national clearinghouse for research data, interchanging public, private, and foundation grant information. The 273 members of the 21 study sections listed in the *Science* article were drawn from leading universities as well as private hospitals, State health services, foundations, and pharmaceutical companies. Roughly one-third were liaison or ex officio members representing military organizations with research interests (Army, Navy, and Veterans Administration) or PHS. The study section rosters were crowded with the names of leading researchers as well as rising NIH administrators, including the next two NIH Directors, Henry Sebrell and James Shannon. A remarkable gathering of the Nation’s life science talent base, these consultants and the first 264 grantees were expected to have “an early and profound effect upon the course of medical history and the nation’s health.”⁴³



10. NIH Director Dyer (seated center), DRG Chief Van Slyke (seated, 5th from right), and Deputy Chief Allen (standing, far left) with study section representatives, about 1947.
Courtesy of the National Library of Medicine.

An advance mailing of the *Science* article to all consultants in October brought effusive praise and initiated a long-standing practice of polling advisers to validate policy decisions.⁴⁴ The highly favorable reception accorded the initial Division program, coming on the heels of the first legislative defeat for the proposed National Research Foundation, signaled that NIH stood to inherit the mantle of science leadership in medicine. When Parran went before Congress in March 1947 to testify against the new bills, Van Slyke had him distribute 25 *Science* reprints to the congressional committee and persuaded him to ask for special language restricting the Foundation's right to interfere with the research budget of any other Federal agency.⁴⁵

Although basic research in clinical sciences was the preferred area of specialization, the leading focus of grant activity in the Division's first year was experimental therapeutics, particularly streptomycin treatments for tuberculosis. In these studies, clinical trials and drug procurement put a premium on control rather than investigational freedom. When the Truman Administration thrust the program upon PHS in the fall of 1946, Van Slyke's philosophy of "trust the scientist" was put to an early and somewhat unsettling test.⁴⁶

The streptomycin program had been run by the National Research Council's Committee on Chemotherapeutics for 8 months during 1946, with manufacturers supplying \$1 million worth of streptomycin for trials in Veterans Administration hospitals.⁴⁷ When the firms ceased the donations on September 1, the drug's curative potential had been demonstrated, but an aggressive clinical program had to be rapidly developed to limit toxic effects, overcome bacterial resistance, and establish optimal dosage rates. The American Trudeau Society and the National Tuberculosis Association, sponsors of streptomycin development in the war years, asked PHS in October to fund and program clinical trials and long-term research.⁴⁸ Confident that curative therapies could be rapidly developed, Parran and Van Slyke quickly selected a



11. Tuberculosis Study Section members Dr. Walsh McDermott, Cornell Medical College (L), and Dr. Corwin Hinshaw, Mayo Clinic, conducted preliminary clinical trials during 1946, which demonstrated the curative effects of streptomycin. During 1947–1949, the Tuberculosis Study Section set up a program of directed research and nationwide clinical trials, which led to the development of a successful combination therapy by 1952.

22-member Tuberculosis Study Section (TBSS) from leading clinicians and researchers and reallocated \$100,000 for initial research expenses. The new study section was to evaluate grant applications, provide scientific guidance, oversee drug procurement and allotment, coordinate biologic testing, and program clinical trials. However, the \$6.02 million budget supplemental, which Parran submitted in November, was not accepted by the Bureau of the Budget. The study section had to operate with a drastically reduced program until July, when Congressman Frank Keefe (R-Wisconsin) allowed a \$1 million budget augmentation for tuberculosis studies.⁴⁹

Fiscal stringency and the nearness of a clinical cure exerted special pressures on the Tuberculosis Study Section (TBSS), which from its inception had been a special case among the original study sections. When the first five grant applications were reviewed in January 1947, the Division attached a recommended reallocation before the review to ensure that the TBSS budget of \$100,000 would not be overdrawn.⁵⁰ A more significant impact followed the May 24-28, 1947, meeting, when a steering committee demanded preselected control groups of patients to receive placebos and strict rules as to patient age and type of tuberculosis. Other members of the TBSS wanted free-ranging, fundamental research projects without controls. The issue was decided by unexpected congressional rejection of a \$3 million supplement for streptomycin trials, following which the project was drastically downsized. The philosophy of the program was revised "from that of free research to a target study," in which selected clinicians followed a rigidly controlled protocol and reported all data through a central office established by the TBSS.⁵¹

Clinical trials did lead to successful streptomycin therapies for tuberculosis over a 5-year period. But the philosophy of directed research was now an unwelcomed competitor to investigational freedom. Van Slyke was persuaded by the episode that "scientific work must be firmly directed, adequately funded, and carried forward by the team work of many men."⁵² His growing partiality to organizational requirements was reflected in the revised priority of study section responsibilities, which he announced in September 1947:

The major responsibility of the TBSS and other Study Sections is not the passing upon of these applications, but is the continuing review of research needs in their special field and the subsequent promotion, stimulation, and coordination of such research.⁵³

Van Slyke had made the pragmatic discovery that with directed research came the germ of program development and

grants management, two functions that had not been assigned to the Division at its inception, but that would become steadily more important as the research economy expanded in size and scope.

1.4

Cultivating the Resources of Science: Fellowships and the Stimulation of Research, August 1947 – August 1948

As the Division began its second year, NIH was weathering a great political storm that would decide the course of its institutional development. Numerous and disparate pieces of legislation were advancing through the Republican-dominated 80th Congress, whose attitude on health policy was both conservative and expansionary. After Congress passed the National Science Foundation Bill in July 1947, the National Advisory Health Council bowed to the inevitable and offered to share responsibility for medical research. But President Truman's surprise pocket veto on August 6 preserved the tentative PHS position as the leading focus of Federal health activities.⁵⁴ PHS also felt threatened by Republican bills, which would have established an independent health agency without research responsibility and other bills separating cancer control and cancer research.⁵⁵ Fiscal Year 1948 appropriations, which became law in July 1947 as Public Laws 165 and 271, raised available NIH grant funding from \$3,052,000 to \$6,245,000.⁵⁶ The unexpected largesse was also problematic, for a bewildering array of earmarked mandates complicated the Division's immediate task, which was to correlate the administration of all PHS extramural research programs.⁵⁷

One area that seemed ready for substantial strengthening of centralized administrative function was the PHS fellowship program, which became a Division responsibility after August 14, 1947, when the organizational name was changed to "Division of Research Grants and Fellowships" (DRGF).⁵⁸ PHS had initiated the program in 1945 primarily to recruit NIH intramural staff for

laboratories at Bethesda. By 1947, however, the secondary purpose of building up extramural university and laboratory facilities had become more important. In the expanded program, PHS fellows had wide latitude in choosing a research venue. Of 161 fellows appointed by May 6, 1947, 34 chose to work at NIH, and 127 located in some 50 universities, laboratories, and hospitals outside Bethesda.⁵⁹

Van Slyke and Parran sought to maximize the extramural side of the program. They were convinced that wartime reduction in the output of scientific Ph.D.s was the most formidable remaining obstacle to postwar biomedical advances.⁶⁰ In October 1946, Van Slyke proposed a vast nationwide effort dispensing \$10,750,000 yearly to some 7,000 promising predoctoral and postdoctoral scientists and senior researchers.⁶¹ The considerably smaller program model that Parran chose to implement the following July envisioned selection committees at 80 universities, which would forward applications to a Central Qualifications Board at NIH and then to five Specialty Fellowship Boards for decision. The Division was to serve as an information clearing-house, vouchering service, and coordinator for programs run by Institutes and Divisions, and its chief was to head the Policy Committee on Research Grants and Fellowships, which supervised the emerging extramural system.⁶²

During FY 1948, the expanded PHS fellowship program at first developed considerable momentum. Funding from the National Cancer Institute (NCI), NIH, and the National Institute of Mental Health (NIMH) stood at \$945,900, up from \$145,905 in FY 1947, and 264 fellowships were awarded, an increase of 164.⁶³ In December, Van Slyke and Allen visited 50 universities, promoting applications and setting up screening committees. Plans to visit another 80 schools in spring 1948 were canceled when the Budget Bureau refused to forward a deficiency appropriation request for \$1,750,000, and an operating deficit seemed unavoidable.⁶⁴ The Truman Administration cited the recommendation of John W. Steelman's Scientific Research Board that

fellowship programs be coordinated by the Federal Security Agency. However, another reason for the policy shift was the replacement of Surgeon General Parran by Leonard Scheele in April 1948. Parran's "categorical approach...with centralized administration" required Institutes and Divisions with fellowship programs to contribute funds into a common pool administered by DRGF. Scheele, in contrast, wanted to de-emphasize categorical divisions, and in November 1948, he announced that the PHS would seek "a more generalized and unified approach" to administration with control mechanisms focused above the Division level.⁶⁵

A swift denouement ensued, in which the Central Qualifications Board offered to disband, and the Policy Committee was "supplanted" by a new PHS body, the Permanent Central Training Committee, in which the Division had no supervisory responsibilities, and its chief played only a minor role.⁶⁶ Under this new aegis, the fellowship program resumed its growth pattern, activating 368 awards in Fiscal Year 1949. The Division continued to supply administrative services through its Research Fellowship Branch, but the task of program management was henceforth conducted by the Institutes.

Stimulation of research fields proceeded more effectively through the medium of study sections, which emerged in 1948 as a mature function and the vital center of Division activities.⁶⁷ Using the National Advisory Health Council as a forum for review and award issues, Director Van Slyke refined the grants administration process, redirected funding toward basic research, and encouraged the study sections to survey research fields and to promote new lines of inquiry.

Strengthening of administrative support began in March 1947, when Van Slyke assigned two research coordinators, Drs. John D. Porterfield and David E. Price, for full-time support of the executive secretaries, many of whom at that point were ranking Commissioned Corps staff with full-time responsibilities elsewhere in NIH.⁶⁸ A year later, nine executive assistants were

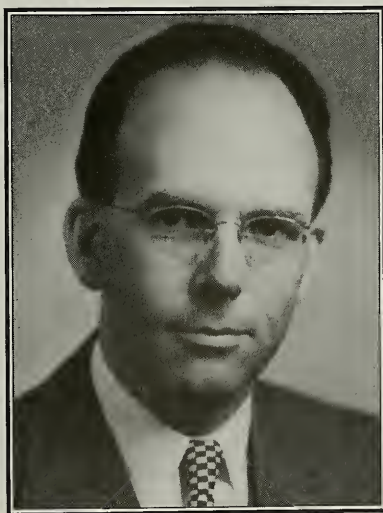
attached to the sections, and this cadre quietly took over most routine duties relating to analysis and evaluation of applications. The executive secretaries continued to chair meetings, while the assistants — who were typically assigned to two or three study sections — supervised the paper flow, ensured that applications were complete, and performed liaison tasks with applicants and other sections between meetings.⁶⁹ By 1949, the scientific staff supporting the 21 study sections included a review officer, Dr. Gordon H. Seger, and a staff statistician, Dr. Stella L. Deignan, as well as audit, budget, and project control sections.⁷⁰

Considerable progress in “correlating and centralizing” NIH research grants was recorded at a series of special forums during FY 1948. At the October 1947 NAHC meeting, Van Slyke set an important precedent by inviting study section chairmen and executive secretaries for an extended discussion of grant issues. Study section initiatives were vigorous and wide-ranging. The Council accepted “forward financing” of long-term grants for up to 5 years, decided against adding more study sections, and authorized preliminary review by small executive committees as an alternative to mail balloting.⁷¹

A follow-on meeting of chairmen and executive secretaries on March 13, 1948, established a single calendar for application filings and study section meetings, called for annual study section reports, and counseled reviewers against insensitivity in disapproval recommendations, a source of grantee complaints.⁷² The study sections were polled for 5-year budget estimates and program direction assessments, a compiled version of which was published and circulated in August. This 128-page volume, the first comprehensive survey of NIH extramural research, accurately predicted research expansion through 1954.⁷³ Other refinements included a priority rating system, a prospective uniform rating sheet, and consultant remuneration at the rate of \$39.75 per day plus transportation expenses.⁷⁴

Much of the impetus for extramural policy development under Director Van Slyke carried over in summer 1948 to a new

PHS planning organization, the Research Planning Council, and its leading component, the NIH Office of Research Planning (ORP). Under Charles V. Kidd, the NIH/ORP staff set out to coordinate extramural policy and programs, while administration and information service activities for extramural grants remained with the Division.⁷⁵ Before leaving office to head the new National Heart Institute on August 1, 1948, Van Slyke initiated studies aimed at curtailing penicillin treatments for syphilis and diverting resources to more fundamental studies in biological sciences and chronic disease.⁷⁶ The direction of the NIH grants program had been set, and the institutional structure laid out, for a decade of development. And in the political arena, where national science policy was still a vexing question, the pragmatic point had been made that the combination of decentralized administration and autonomous peer review produced a successful organizational formula for the scientific community as a whole. As one study section enthusiast wrote to his Congressman, "Congress might wish to leave medical research in this present pattern."⁷⁷



12. Dr. David E. Price, Chief, Division of Research Grants and Fellowships, 1948–1950; Associate Director, NIH, 1950 – 1952; Assistant Surgeon General, 1952 – 1957; Deputy Director, NIH, 1960 – 1962.

1.5

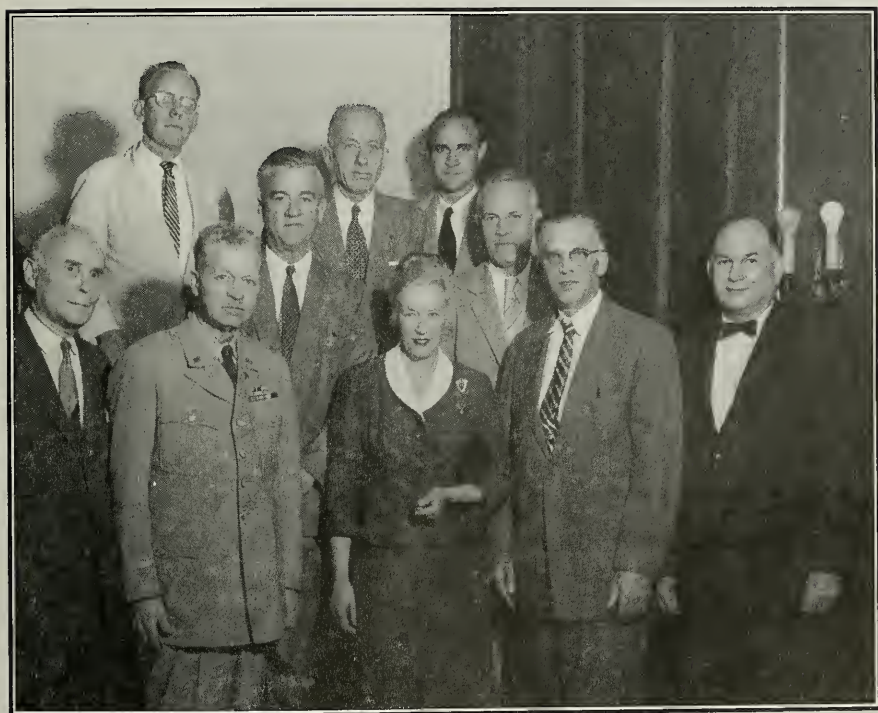
*Towards an Extramural System:
Institutional Grants, the Loyalty Question, and
Centralized Review, August 1948 – December 1950*

Dr. Van Slyke was succeeded as DRG Director by his former assistant, Dr. David E. Price, who had headed the NCI grants branch since 1947. The tenure of the taciturn Californian, from August 1948 to December 1950, coincided with the onset of a sea change in the Nation's research economy. Universities and medical schools had come to rely on Federal grant money, but rapid expansion and the exclusion of overhead costs left them with increasingly large operating deficits.⁷⁸ Grants to institutions, which the schools preferred over project grants, were in trial use in the Cancer Control program and the Mental Health Institute. Preliminary indications that the Heart Institute would start a large training grant program for medical schools in mid-1949 brought considerable alarm at DRG. Soon to overshadow grants to individual investigators, institutional grants ran against the philosophy of individualism Dyer and Van Slyke had built into the extramural program. Block fellowship grants, another institutional program, were seen as benefiting a few well-established universities. In contrast, opinion among study section members tended to favor building up underutilized sections of the research economy with grants to smaller schools.⁷⁹

On the Bethesda campus in 1949, harbingers of change abounded. The superstructure began to rise on the new, 500-bed Clinical Center, and intramural laboratories and divisions were feverishly expanding the scientific staff preparatory to a 1952 opening.⁸⁰ Racial segregation, a feature of Public Health Service operations since World War I, began to yield as the Truman Administration launched the first affirmative action program to impact grants activities. Dyer's staff was looking for ways to stimulate "Negro Medical Education" by special support for Howard and Meharry Medical Schools. Initial results were modest, but an

important beginning had been made.⁸¹ The Division also became responsive to the small but growing number of women scientific staff added during the wartime expansion. In 1949, the first female Executive Secretary, Dr. Eleanor M. Darby, was appointed to the Cardiovascular and Gerontology study sections.

A more ominous augury crossed the NIH Director's desk in July 1948, shortly after the University of Washington fired three tenured professors for past associations with the Communist Party. Since July 1947, Federal Security Agency policy required NIH to secure from "every incumbent employee" an affidavit of loyalty to the United States. This affidavit of loyalty was applied to 422



13. Dr. Eleanor M. Darby, first woman to serve as a DRG Executive Secretary, with the Cardiovascular Study Section in September 1956. Standing, far left: Dr. Andre F. Cournand, Nobelist; 4th from left, Dr. Keith Grimson, Chairman; far right, Dr. K. Jefferson Thompson. Rear row: Drs. Robert P. Grant, Homer Smith, and Arthur C. Guyton.

fellows then on duty, most of them outside Bethesda.⁸² Dyer complied and prepared loyalty checks for regular employees, but on fellowships he deferred to the Division, which insisted the fellows were not employees and not subject to Government investigation.

The issue became critical in May 1949, when Senate Appropriations investigators found several Atomic Energy Commission fellows to be security risks. According to Dr. Price's summary of previous policy, the Division held that academic freedom should be respected, that universities had jurisdiction over selection of fellows, and that investigations and appeals would hopelessly complicate fellowship selection and awards.⁸³ Although the Institute directors agreed that no checks were needed, the Senate's will prevailed, and the Division mandated that all fellows swear an anti-Communist oath as a condition of award. On July 28, 1949, the Surgeon General extended the requirement to consultants serving on study sections, who were also subject to FBI investigations if their service exceeded 90 days.⁸⁴

Although loyalty checks were mandatory for all Federal service personnel, and NIH was especially sensitive to congressional requirements, the Division did its duty under considerable protest. In January 1950, when Administration loyalty officials extended PHS investigational authority to research grantees and their employees, Assistant Chief Allen remonstrated that the security requirement stood "in direct contradiction to the philosophy and policy developed by the Public Health Service in the operation of its research grants program." Despite Allen's warning that further investigations "would probably jeopardize the esteem and value that the program now holds in the eyes of scientific investigators throughout the Nation,"⁸⁵ extramural grantees were subject to investigation and removal until 1955. For Van Slyke and others who had staked their reputations on assurances that "Federal dictation" would not be tolerated in the grants program, it was a bitter pill to swallow, but something they felt compelled to

do to protect the program from those who might have dismantled it entirely.⁸⁶

These new and unwelcome political requirements complicated the awards process during a period of rapid and uneven growth, in terms of both the volume of applications and the complexity of categorical requirements. In 1949, the Heart, Cancer, and Dental Advisory Councils agreed to use the NIH study sections for “technical advice” on applications their grants branches presented in council for approval. The study sections were reorganized and reoriented towards noncategorical research, which then became the focus of Division review activity.⁸⁷ As the numbers of study sections shrank from 21 to 18, the volume of awards swelled from 1,091 (\$10.8 million) in FY 1949 to 1,556 (\$14.2 million) in FY 1950. The Division also processed 1,576 fellowship applications during FY 1950, an increase from 742 received in fiscal 1949.⁸⁸ The trend toward proliferation in categorical undertakings, which produced new Institutes for arthritis and neurological diseases in 1950, brought more application transfers between study sections and multiplied differences in procedures adopted by each council.⁸⁹ However, the institutional framework of peer review proved to be highly adaptive to new requirements. In 1949, the Cancer Institute began sending applications to a new DRG study section, Morphology and Genetics, thereby ending a practice of internal Council review dating back to 1937.⁹⁰

As director, Dr. Price’s priority was to centralize the application and referral process and to build continuity into a disaggregated system.⁹¹ “We went through a rather stormy and difficult period,” he recollected in a 1964 interview, referring to the effort to integrate the Institute grants branches into the DRG review system.⁹² To create a more efficient paper flow, Price contracted an outside evaluation of management and operations, which recommended that study sections be consolidated to simplify referral. The study also detailed new clerical procedures to simplify the preparation of abstracts and summaries, resulting in

fewer clerical positions and an overall staff reduction from 122 to 102 during 1949-1950.⁹³ Price's most far-reaching innovation was establishing the position of DRG Scientific Director, with authority over the review process and responsibility for the direction of noncategorical research. This initiated formal efforts at program development, which would comprise a major focus of Division activities through the next decade. The new scientific director was also expected to evaluate the efficiency of research undertakings, as well as review and award procedures. Before the first incumbent, Dr. Kenneth M. Endicott, was appointed, Dr. Price on December 7, 1950, was transferred to the Office of the Director, NIH, where he became the first Associate Director responsible for extramural activities.⁹⁴

1.6

The Postwar Evolution of NIH Peer Review: Study Sections, the Cancer Grant Debate, and the Legacy of OSRD, 1945 – 1950

In the postwar period, the development of DRG was strongly influenced by Vannevar Bush and his 1945 proposal for a National Research Foundation. His elucidation of the Federal role in basic research — autonomous investigators, control by non-Government scientists, and the massive provision of public resources to the research economy — set the terms of reference for the postwar mobilization of biomedical science by NIH. Yet the mechanisms initially derived by Van Slyke, Price, and other NIH extramural administrators for this mobilization came out of a broader and older PHS experience, which contravened the Bush approach in several important respects. Centralized administration of Government research grants proved to be more efficient and responsive to changing research requirements, more capable of rapid expansion, and more suitable to controlled applications than the patronage of private foundations that Bush used as a model in *Science — The Endless Frontier*. The relationship between PHS and



14. National Advisory Cancer Council, 1950. Courtesy of the National Archives.

15. (below) National Advisory Health Council, 1950. From left: Byron H. Larabee, N. Palmer Dearing, Wilton L. Halverson, David C. Crockett, Surgeon General A. Scheele, Karl F. Meyer, Robert F. Loeb, Francis G. Blake, Thorndike Saville, and NIH Director Henry W. Seabell.





16. Biochemistry and Nutrition Study Section, 1948. Seated at far side of table, from left: Dr. Irvin Fuhr, Executive Assistant; Dr. Floyd Daft, Executive Secretary; Dr. Charles Glen King, Chairman.



17. Physiology Study Section, 1948. Dr. Wallace O. Fenn, Chairman, is seated sixth from right. Dr. Severo Ochoa, future Nobelist, is on his right, followed by Dr. J. F. Yeager, Executive Assistant and Acting Executive Secretary.

the Bush report was essentially political, as spelled out by NIH Director Rolla E. Dyer in the Division's May 1946 functions statement, was essentially pragmatic:

Funding of all applications through one office would effect economy that might well bear on two very important matters that will confront us all in the future: (1) securing of Bureau of the Budget and congressional approval of estimates will be facilitated if there can be shown concentration of administration of these various programs into one office that will effect economies both in financing and in personnel ceilings, and (2) sound psychology to ensure retention in the U.S. Public Health Service of research grants-in-aid programs and to refute arguments that may be present for transfer of these activities to the proposed National Science Foundation.⁹⁵

Only by combining the values articulated in the Bush Report with the practical experience gained from administering disease control programs could PHS bid for leadership in medical research after 1945.

In the evolution of grants peer review at NIH after 1945, the influence of *Science* — *The Endless Frontier* was problematic. The article raised issues between assertions supporting expert review and the lack of any prescribed mechanism for scientific consultation at the project level. The function that NIH devised to bridge this gap, study sections, undertook what Bush insisted could not be done — to assess the merits of large numbers of “small and transitory projects” from outside the setting where the research was to take place.⁹⁶ In organizational form, the study sections were patterned largely on OSRD/CMR review panels. Each consisted of 8 to 12 civilian scientists “chosen because of unusual eminence in the particular field,” together with Army, Navy, Veterans Administration, and other agency representatives, for liaison with parallel research endeavors. Also attending was a PHS staff

contingent, including the executive secretary and a research assistant, as well as a recording secretary and often the Division's referral officer and statistician.⁹⁷

The Division treated the study sections as autonomous bodies, to which the Service provided liaison and administrative support, but not control. This relationship was codified in the Chairman's Grant, an annual allowance for consultant's fees, travel reimbursement, and expenses "incident to the research business of the section."⁹⁸ Dispensing operating funds as grants allowed the Division to claim section members "would no longer act in the capacity or receive any remuneration from the Federal Government as consultants of the Surgeon General."⁹⁹ Apart from assuring disinterested technical reviews, the Chairman's Grants also enabled study sections to independently sponsor symposia, lecture series, and other stimulating research. It also provided per diem payments to consultants hired for special ad hoc reviews.¹⁰⁰

Although a standardized paperflow for grant applications made the review process seem routine, the review practices of the initial cycle of NIH study sections were more variegated and less systematized than in later eras. Prospective grantees submitted a four-page standardized application form and a 200-word summary of the project for circulation to other agencies upon approval.¹⁰¹ Clerk typists in the Division's Project Control Office laboriously retyped a verbatim copy to ensure that internal segments followed a prescribed reading order. This "abstract" was then circulated to the study section in the 2 weeks prior to each of three annual meetings. Most study sections did not assign reviewers, but passed judgment on each application after reading and discussion. Those recommended for approval were assigned a budget and forwarded to the council, which reversed few and only with written notification to the study section's chairman.¹⁰² In general, the process, although quite unrefined, yielded substantial returns to applicants. The approval rate for the first 12 months of the program was 47.8 percent, or 196 approvals out of 410 applications reviewed; for FY

1947-1948, the rate was 73.4 percent, or 1,526 approvals out of 2,078 applications reviewed.¹⁰³

Viewed from within, the review process seemed more disorderly, and this quality reflected the generous grant of autonomy that the study sections enjoyed in the postwar period. Criteria for evaluating applications and recommending awards varied widely among the study sections. Some recommended disapproval "because the investigator is not well known"; others, "because there are too many grants at one school." Reductions in award amounts were made in ways that seemed capricious to grantees. The Health Council recommended in February 1948 that the study sections develop preliminary rating sheets to notify applicants of an initial decision; but no numbering system was used, and each study section generated a different one-page format to register approval or disapproval.¹⁰⁴

In January 1949, the Division prescribed two important format changes to begin the process of systemizing review. A priority rating system utilizing a 1-to-5 scale was proposed, along with rating criteria to establish order of payment. Scientific priority, however, was still an open option for each study section. In addition, the Division prescribed a summary statement for reporting recommended actions to the Council. This one-page form, which contained a brief summary of the initial review, also bore a letter designating one of the seven review categories set up by the Health Council. Continuation applications and new "exploratory" projects recommended without reduction could be "adopted enbloc," while consideration in detail was reserved for projects running over 2 years in length or \$5,000 in amount, or for those that had been "significantly modified" in the initial review. A bound set of summary sheets was mailed to each Council member 2 weeks before each meeting.¹⁰⁵

After 12 months of operations, the Division, in December 1946, comprised a professional and administrative staff of 32 and 265 "Special Consultants" organized into 21 study sections. The

Division's administrative role, directed by Surgeon General Parran but not mandated by Congress, was to "centralize" the PHS grant programs and to "correlate" extramural research with NIH intramural and the research programs of other Federal agencies.¹⁰⁶ The major stumbling block was NCI, which had funded fellowships and research grants since 1937 through an independent mechanism. NCI wanted its external research closely integrated with internal research, reviewed internally, monitored in process, and folded directly into Institute programs upon completion.¹⁰⁷ The National Advisory Cancer Council preferred to pass on the merits of grant applications without prior technical review, and only occasionally consulted an NCI staff scientist when a decision was not forthcoming. During 1947, Cancer's internal review system began falling behind the rising volume of grant applications, but it was still unwilling to establish review panels or share review authority.¹⁰⁸

NIH Director Dyer made a special appeal to the Cancer Council at the June 1948 meeting, in which he predicted that adoption of study sections for review would allow "en mass approval of certain types of projects" and relieve intramural scientists of a heavy burden of consultation. Dr. Ralph Meader, deputy chief of the Cancer Research Grants Branch, then drew up a plan for augmentation of selected study sections with cancer specialists and for a gradual shifting of review responsibilities away from the Council. A merging of the two systems began in 1950, when new Cancer applications were routed through Morphology and Genetics and other study sections.¹⁰⁹

By 1950, the study sections stood poised on the threshold of a major expansion, driven equally by congressional scrutiny and a relentless increasing workload. The first comprehensive survey of study section issues, completed by Charles Kidd in April 1950, found that 30 percent of all funds granted went to sitting study section members or their close associates. The detailed findings yielded a more significant conclusion, however. A subset of eight

study sections with the highest concentration of awards to sitting members predominantly consisted of former OSRD organizations subsumed under the Division mantle (Tuberculosis, Malaria, Antibiotics, Syphilis) or new organizations with heavy military responsibilities (Bacteriology).¹¹⁰ The Division reworked these findings and publicized in 1953 a very different analysis, claiming that the clustering of grants accorded with the “research potential” of various regions and should not be considered favoritism.¹¹¹

These conclusions represented different facets of the same reality. The Division was growing beyond its OSRD roots, dispensing research funding along a wide geographic distribution as it prepared for the coming era of biomedicine. At the same time, there was an inner consciousness that the wartime mobilization had been a source of great strength and, as well, a by-product of practical wisdom about the business of conducting and supporting research in a Government setting. This strength would amply prove itself in the great expansion that ensued in the following decade.

***“Good Men and Free Money”:
Grants Administration in an Era of
Cooperation and Growth,
1951–1960***

The campaigns for funds for Poliomyelitis, Cancer, Tuberculosis, and Heart Disease, and the existence of this committee, demonstrate that our people desire that the rate of discovery of medical knowledge be increased... What is needed to augment and to prevent a slow down in the rate of production of medical knowledge is more good research men and more free money.

Dr. A. C. Ivy, opening statement,
National Health Assembly, Research Section,
May 1, 1948

The shape of postwar medical research was greatly influenced by a series of national conferences, convened in a wide variety of professional settings between 1948 and 1955. Within the context of the larger debate on national health insurance, these conferences addressed emerging research policy issues defined by non-Federal scientists, university forums, and professional associations. Among the key questions addressed were how the new biological specializations would change clinical medicine, how Federal funding could be used to expand medical schools and academic health centers, and how biomedical advances could be applied to the population at large. At these conferences, representatives of NIH and DRG played key roles as interlocutors and consensus-builders. In addition, the Division tracked and evaluated trends in Federal medical research through its publications.¹

The keynote for this conference cycle was the National Health Assembly, which drew 800 leading public health figures to Washington's Statler Hotel in the spring of 1948. Convened by Oscar Ewing, Administrator of the Federal Security Agency to develop a program of health goals, the Assembly was the Truman Administration's attempt to refocus the debate on National Health Insurance after the Republican 80th Congress killed the first bills in 1947-1948.² Medical schools faced a recession, the Assembly's working sessions were told, and the bright promise of the emerging clinical medicine would remain unfulfilled unless drastic steps were taken to increase the production of science Ph.D.s by one-third. Challenged by President Truman to outline a 10-year program for the Nation, the Assembly recommended a variety of governmental support mechanisms intended to leave scientific control in investigators' hands and administrative control at the university level. Federal money in unprecedented amounts was to subsidize medical school faculty positions, raise researchers' salaries, underwrite laboratory construction, support training programs and career fellowships, and stimulate research fields where advances seemed imminent.³

Each of these proposed programs focused on the individual investigator, freed of governmental "dictation" and bureaucratic oversight. Even institutional grants were to be allotted to senior investigators whose projects were exempt from review. Implicitly, the Assembly was proposing that the Federal Government should assume the prewar role of private foundations in disinterestedly sponsoring independent research. In marked contrast to the Administration's preference for increased Federal oversight of medical research, the Assembly argued that the Nation could overcome the shortage of scientific workers with more "good men and free money."⁴ The Assembly also took a strong position in favor of training grants and new fellowship programs. These positions were incorporated in Truman's 1949 omnibus health bill and enacted in the 1950 Research Institutes Act, which authorized training grant and fellowship programs.⁵

The ensuing 12 years brought tremendous growth and rapid change to NIH and DRG. In 1948, with a staff of 94, the Division provided review and referral services for 986 grant awards and 264 fellowship awards with a combined value of \$12.9 million. In 1960, a staff of 516 provided review, audit, and administration for 11,572 research project grants, 3,729 fellowship awards, 171 construction grants, and 2,626 training grants with a total value of \$318 million.⁶ What began as a straightforward, missionary enterprise to stimulate fundamental research evolved into a complex administrative experiment in managing newly emerging sectors of the grants economy, in accordance with congressional mandate and oversight. The Division was called upon to administer a wide variety of health research activities that soon passed to other organizations, but its inner focus remained on the grants mechanism and peer review, which changed remarkably little in the halcyon environment of the 1950s. In the succeeding era, DRG would refocus on the core activities of peer review, award processing, and statistical analysis. As an exercise in institution-building, the 1950s experience in direct administration gave the Division's leadership a sense of cooperative engagement in biomedical development that persisted through the following decades.

2.1

NIH and Extramural Research in the Crisis of the Korean War, 1951 - 1953

The research revolution, which created the synthesis of clinical medicine and fundamental biology and chemistry known as biomedicine and which thrust NIH into national pre-eminence at the end of the decade, was already well underway in 1950. However, the unexpected outbreak of war in Korea threw into disarray the tenuous political coalition of congressional healthcare advocates, private research lobbyists, and grassroots organizations responsible for widening Federal research support since 1946.⁷ In

July, after Truman began the mobilization by declaring a state of emergency, two public statements marked a turning point. The first was Surgeon General Scheele's editorial in the *American Journal of Medicine*, announcing successful clinical applications of cortisone and the portent of a "new era" in basic research.⁸ Then, on July 21, 1950, Truman directed the Federal Security Administrator to begin "curtailing . . . those programs which do not directly contribute to defense," including grant and fellowship programs. A rescission reduced the NIH FY 1951 appropriation of \$15,750,000 by 9.1 percent, halving the extramural growth rate and forcing the NIH budget onto a lower track for the next 4 years. Funds available to DRG through the research grants portion of the NIH appropriation were cut from \$9,150,000 to \$7,928,000 for FY 1951, and the \$3,600,000 earmarked for cortisone studies was reduced by a third. For the new biomedicine, this was not an auspicious beginning.⁹

Recent memories of the successful mobilization of science during World War II — massive Federal spending, expedited administration, and high-level political direction — conditioned the initial NIH response. With tacit Presidential support, the staff of outgoing NIH Director Dyer and Senators Claude D. Pepper and Warren G. Magnuson in August 1950 pressed a Senate appropriations amendment, which would have added \$30 million to the FY 1951 NIH appropriation. Eight million dollars would fund approved meritorious grants; the balance was for a new cycle of defense-related projects in biological warfare defense, measuring radiation effects, and blood fraction preservation for the treatment of atomic blast casualties. The measure followed floor efforts by Magnuson and Pepper to add \$64 million, covering Heart, Cancer, and Mental Health funding for construction, research, and training.¹⁰ The prospective appropriations total — \$79 million — represented the full measure of NIH research needs for FY 1951. Both amendments failed to carry, and budgetary stringency became the norm. Not until 1955 would the NIH budget pass the \$79 million mark.¹¹

In October 1950, as Dr. William H. Sebrell, Jr. began serving as NIH Director, the Office of Research Planning (ORP) promoted a series of major defense-related research initiatives without waiting for Defense Department requests. Keeping the initiative, as Dyer had advised, allowed NIH to "avoid possible violence to its basic program."¹² Chief among the new starts were the National Blood Program, which conducted studies of blood fractions and stockpiled plasma supplies; the Radiation Studies Committee, which reviewed and supported studies of radiation exposure at atomic test sites, radiation effects on cells, and dose tolerance among primates; and the Sectional Research Program in Microbiology, which set up a nationwide network of 31 laboratories to test diagnostic antigens needed for defense against biological weapons. All these programs utilized extramural resources. NIH underwrote the National Blood Program for 2 years, using \$1.4 million reallocated from Heart and Cancer appropriations, until defense spending materialized.¹³ The Committee on Radiation Studies functioned as a study section and endeavored to set up a monkey colony in Florida for a 20-year study of radiation effects.¹⁴ Also acting as a DRG study section, the Ad Hoc Committee on Sectional Research in Microbiology recommended awards of administrative grants to its own members. These were for personal travel expenses, consultants' fees, and the purchase of diagnostic reagents needed for onsite identification of chemical and biological warfare agents introduced into the United States during hostilities. Initially approved for \$95,000 for FY 1951, these grants were administered by the Division and functioned in lieu of formal Department of Defense (DOD) contracts.¹⁵

While not uniformly successful, NIH defense efforts were generally productive. In the summer of 1951, the National Microbiological Institute had significant success in emergency field trials of a new antimalarial drug, primaquine, and was prepared to divert half of its intramural research program to military projects.¹⁶ By 1952, however, Sebrell and the ORP had

decided against long-term mobilization commitments. The NIH leadership found mobilization committees to be ineffective, defense agencies slow in paying for war research, and the entire mobilization effort to be shot through with an "indecisiveness and wavering," which reflected the war's uncertain duration and varying intensity. Research agencies had no protection against severe personnel dislocations caused by the "doctor draft" and reserve call-ups of support staff. Future NIH expansion would be difficult in the face of a projected net deficit of 22,000 physicians by 1954.¹⁷

In response to these uncertainties, ORP worked to achieve independent status for NIH in relations with defense agencies. The more immediate organizational problem, given the failure to forge new ties with the military services, was to centralize and consolidate a new extramural system. The process of redefinition began in July 1950, when the prospect of two new categorical Institutes, Arthritis and Metabolic Diseases (NIAMD) and Neurological Diseases and Blindness (NINDB), induced ORP Chief Charles V. Kidd and NIH Director Dyer to set up the Committee on Administration of NIH Grants and Awards. Surgeon General Scheele, convinced that functions and services could be centralized within the PHS Bureaus, wanted to relocate grant administration at the Bureau level.¹⁸ In October, a task force of this committee recommended instead that the categorical Institutes be the administrative focus of the extramural program and that centralization be achieved within NIH by first coordinating procedures between Institutes and then integrating them with DRG services.¹⁹

A final report, approved September 6, 1951, recommended setting up an Executive Committee on Extramural Affairs (ECEA) under the NIH Associate Director for Extramural Programs (ADEP) to "reach agreements binding on all Institutes." DRG was given five centralized service functions: audits of grants and awards, scientific evaluation of grant applications, maintenance of program statistics, preparation and distribution of grant

information, and technical evaluation of program activities. The Institutes were given major responsibility for program control, and the Research Planning Branch, Office of the Director, NIH, took the function of general analysis. A Policy Committee for Extramural Programs was also set up to compile "the great body of significant policy award precedent, including organizational agreements between the Division and the Branches."²⁰ The Policy Committee was also charged with overseeing training programs and reducing variations in the administration of Institute extramural programs. Together with the Surgeon General's delegation of grantmaking authority to the Institute directors on February 12, 1951,²¹ this reallocation of roles gave the balance of responsibilities to the categorical Institutes.



18. Ernest M. Allen, Scientist Director, USPHS. Assistant Chief, Research Grants Office, 1946 – 1950; Chief, Division of Research Grants, 1951 – 1960; NIH Associate Director, 1960 – 1963; Grants Policy Advisor, Office of the Surgeon General, 1963 – 1968; Deputy Assistant Secretary for Grants Administration, DHEW, 1969 – 1973.

The Institute Directors' charge to the ECEA, which Allen drafted, also formally established the policy of "double staff review," or dual review, which mandated separate reviews for scientific merit and program interest. When the ECEA began meeting on November 14, 1951, under Associate Director David E. Price,²² this policy was not recognized by outside agencies. Beginning in August 1951, the Bureau of the Budget, whose chief had to approve the annual NIH appropriation request presentation to Congress, claimed the right to review all extramural applications, which entailed statistical surveys. Allen, appointed Division Chief in January 1951, joined the Surgeon General in protesting the intrusion of governmental controls into study section decisions. However, a DRG Committee on Standards for Grants Surveys was set up in June 1952, and the Public Health Study Section was instructed to recommend approvals in principle only, subject to Committee approval.²³ Similarly, the unified statistical function intended for the Division was compromised when project description files were removed to the Smithsonian Institution's Bio-Sciences Information Exchange.²⁴ Despite these bureaucratic infringements, the net effect of categorical reorganization was to set up a decentralized NIH authority structure that would be autonomous within the Public Health Service and also resistant to various consolidation efforts, such as the Hoover Commission, which the Truman Administration promoted in the name of administrative efficiency.²⁵

The task that fell to the extramural component of the reorganized NIH in 1952 was to broaden the national research structure by providing new funding mechanisms and technical support to investigators and institutions in the forefront of biomedical expansion.²⁶ After 1950, the congressional attitude on health issues had become adversarial, and congressional committees now questioned the need for any significant expansion of funding.²⁷ But a more formidable obstacle developed in the five advisory councils, where large majorities resisted opening any new grant venue that might reduce the number of individual project

awards. In February 1951, various university and medical school associations asked that the overhead allowance on project grants be increased from 8 to 15 percent. The councils in joint session refused, because higher payments to institutions would increase the backlog of unpaid meritorious projects, then standing at 21.9 percent of applications recommended for award by the Health Council.²⁸

Pressures from the scientific community for new grant mechanisms continued to build through the Korean War years, however, as the limitations of traditional project research became generally acknowledged. Investigators wanted longer support periods than 1 year, the opportunity to pursue larger projects on a joint basis, and locally administered special investigations outside categorical structures. Administrators wanted more comprehensive support of academic departments, reimbursement of indirect costs, and direct funding of facilities construction and faculty salaries.²⁹ Realizing that other mechanisms for institutional support — program grants, area grants, and block grants — would also have to be approved by the Council, Associate Director Price, in May 1951, polled study section members to get a broader view on institutional grants.³⁰ This precedent-setting exercise in consensual politics used the PHS research grants consultants as a leadership forum for the national scientific community. Of the 249 current and former members who responded by August 10, 60 percent favored experimenting with institutional grants. Members hoped that block grants to universities would favor basic research, ease study section workloads, and give younger, unknown scientists access to funds at the university level.³¹ The Inter-Council Committee, which received study section advice, recommended only modest trials of area and program grants until a major appropriation increase was forthcoming. The more important contribution was cataloguing the multitude of suggested changes and formulating a package of new grant mechanisms, from construction grants to career fellowship awards, which became the agenda of the next extramural policy era. Allen and the Division

staff strongly supported the institutional grants agenda as the best available means to sustain growth in medical research.

Additional soundings among medical school administrators the next spring brought the realization that the duration of project grants no longer satisfied researchers' needs and that support should be lengthened to 5 years to lessen grantee insecurity. In August, the Surgeon General accepted the Inter-Council Committee's recommendation in principle as well as the 15 percent overhead figure.³² Allen wanted to press the issue with Congress to get specific authorization in PHS amendments for block grants. Legal advice was strongly negative, however, and in January Scheele decided to avoid a major program initiative. Instead, "liberal administration" of existing mechanisms would be used to lengthen grantee tenure and provide a modicum of security for researchers.³³

By the close of 1953, Allen as DRG Chief and Kidd as ORP Chief were strongly committed to developing institutional assistance outside the framework of project grants.³⁴ The focus of extramural planning efforts in Eisenhower's first term and operational policy during Eisenhower's second term, institutional grants allowed the massive expansion of the research economy that was required by the new biomedicine. But, budgetary expansion, the essential prerequisite, was nowhere in sight in 1953. The NIH budget was held to \$59 million, essentially the FY 1951 level. Predoctoral fellowships were transferred to the National Science Foundation and phased out, eliminating support for 200 entry-level laboratory scientists. Half the Health Council awards for 1954 faced inactivation during spring 1953. In a single 2-week period, Allen reported "90 desperate pleas for an early answer" from grantees and new applicants.³⁵ Incoming Health, Education, and Welfare Secretary Oveta Culp Hobby released the FY 1954 funds, but maintained the posture of stringency, deferring implementation of the 15 percent overhead allowance until 1955.³⁶

Allen's work in building a consensus behind institutional grants brought substantial credit to the Division and raised its

standing with the scientific community. In November 1953, the American Public Health Association presented the Division with a Lasker Award for “enabling thousands of scientists in hundreds of institutions to contribute knowledge substantially advancing the Nation’s health.”³⁷ Despite a reduction in staff from 110 to 97 during FY 1951–1953, the Division processed 4,869 grant and fellowship applications in 1953, almost twice the volume serviced in 1951.³⁸ Reorganization reduced the number of study sections from 22 to 20, as investigator interest in clinical therapeutics fell off and interest in preclinical basic research increased. The two most active study sections, Biochemistry and Physiology and Human Genetics, formed the center of the Division’s new special interest in noncategorical research.³⁹

Building T-6 became crowded with an influx of extramural administrators and intramural researchers — primarily expansion staff from NCI. In the summer of 1953, working personnel registered intense discomfort with inadequate air conditioning facilities. T-6 staff collected 207 signatures on a petition requesting emergency relief from heat and “noise, vibrations, and other difficulties comparable to factory conditions.” The more important morale question, however, was whether the growing importance of intramural clinical studies would disaffect researchers hired in an earlier era of microbiology. Leading biochemist Arthur Kornberg left his intramural appointment in 1953 charging that clinical studies would stifle basic research, and many others were expected to follow. A special team of social scientists from Michigan State University spent 2 months surveying intramural and extramural professional staff for the effects of the transition to clinical medicine. The results for DRG professional staff indicated a high level of acceptance and strong Division loyalty. Despite the adverse fiscal climate, the Division saw biomedicine as an altogether welcome future.⁴⁰

2.2

Widening the Extramural Focus: Program Development, Budgetary Constraints, and the Shadow of McCarthyism, 1953 - 1956

The signing of the Panmunjom truce agreement on July 27, 1953, officially ended the Korean War emergency, but it did not move the Eisenhower Administration closer to a science policy. Still committed to limiting the growth of PHS expenditures to reductions achieved in other welfare programs, HEW Secretary Hobby opened the new Clinical Center on July 3 after failing to persuade NIH Director Sebrell to mothball the facility as an economy measure.⁴¹ Similarly, Eisenhower's Budget Bureau attempted to lower the NIH research grants appropriations for Fiscal Year 1954 from \$27.4 million to \$20.4 million, but was outmaneuvered by minority Democratic members who restored the cuts and wrote small increases into the final bill.⁴²

In March 1954, the Administration promulgated its first formal science policy, giving the National Science Foundation (NSF) oversight responsibility over all Federal research organizations and establishing a priority for basic research over applied research. The focus was on achieving administrative efficiency and cooperating with industry, private medical schools, and universities.⁴³ No major funding increase was requested, and no program development ensued. The Administration appointed a second Hoover Commission to investigate whether basic research could be centralized under the NSF. The NIH Office of Research Planning found the Administration effort weak and unfocused. NSF lacked the administrative depth required to coordinate the research economy, and the Hoover Commission's medical section seemed ill-prepared for a national survey.⁴⁴

Kidd and Associate Director James A. Shannon sensed an opportunity, and by August they had formulated a working strategy for PHS that effectively supplanted the Administration

effort in the biomedical field. Building on earlier suggestions from the Hoover Commission, Kidd and his staff proposed new Federal investments in basic research as a means of containing patient care costs. In April 1954, successful field tests of Salk polio vaccine demonstrated that fighting disease in the laboratory was cheaper than in the hospital ward. Scientific manpower was needed to redeploy into clinical research, Kidd argued, and new clinical advances needed speedy dissemination. The extramural system would provide critical linkage, stimulating multidisciplinary investigations and "encouraging optimum cooperation between clinician and investigator."⁴⁵ The new clinical medicine, by this synthesis, was the key to energizing higher levels of basic research activities.

To consolidate its leadership position in biomedical research, Kidd maintained, NIH had to procure Federal support for preclinical researchers and faculty at universities and medical schools.⁴⁶ By using research "investigatorships" to subsidize teaching positions in Anatomy, Physiology, Biochemistry, Microbiology, Pharmacology, and Biophysics, NIH could be assured of a steadily expanding pool of clinical researchers. Although advised by Department counsel that PHS statutes did not authorize aid to medical education generally and that seeking new legislation was "out of line with announced Administration policy," Surgeon General Scheele promoted the Preclinical Sciences Program throughout 1954.⁴⁷ After conferring with 50 medical school administrators and securing acceptance of the program from the seven National Advisory Councils, NIH Director William H. Sebrell and former DRG Chief Cassius Van Slyke, who had been appointed NIH Associate Director for Extramural Affairs in December 1952, met with each study section for a detailed critique and extended discussions. The result was an ever-widening consensus. Study section members endorsed the program by a 113 to 6 margin and suggested upper limits at \$3,000 for individual research grants, 5 years for faculty support,

and \$8,000 for annual salary.⁴⁸ An essential preliminary for the Research Career Award Program of the 1960s, these preparations for expanding stipend support were also an exemplary use of consensual politics to cover a critical gap in law and official policy.

In part, congressional unwillingness to consider new grant support mechanisms can be counted as one of the chilling effects of McCarthyism, which grew in intensity during wartime and peaked during spring 1954.⁴⁹ Congressional investigators had long suspected that PHS harbored disloyal individuals, and the onset of the Eisenhower Administration gave them the opportunity to intensively monitor PHS grantees. Acting under administrative authority, the Federal Bureau of Investigation (FBI) in 1953 set up a PHS security office and screened the 4,360 extramural grantees for security risks.⁵⁰ Secretary Hobby instituted a policy of denying support to grantees against whom the FBI held derogatory information, and approximately 30 investigators, including Nobel Laureate Linus Pauling, were summarily removed from their projects by April 28, 1954, when the program was made public.⁵¹ Many study section members held that screenings for security after merit review debased the core value of scientific integrity, and several study sections passed resolutions pointing out the lack of due process and the gross unfairness of the decisions. The Advisory Councils also were adverse to Departmental practice, and a Cancer Council Subcommittee recommended what would become the successor policy, a requirement that each grantee sign a personal affidavit of loyalty.⁵² When the Department terminated the study section appointment of Yale physiologist John P. Peters for security reasons, the case was successfully argued before the Supreme Court that unclassified basic research did not require a security clearance.⁵³ Nonetheless, Peters was not reinstated to the Metabolism and Nutrition Study Section, and an informal process of screening for security remained in place.

When Marion B. Folsom succeeded Secretary Hobby in August 1955, the program moderated and disallowance of awards

became rare. A National Sciences Advisory Committee had been appointed in January 1955. After 16 months of deliberation, the panel recommended that "an allegation of disloyalty should not by itself be grounds for adverse administration action on a grant," and that "formal charges" in "open hearings" should be the new format. These recommendations were accepted but not implemented, and the process of screening each grantee for security through a "name check" remained in force through 1958, largely outside the control of NIH or DRG.⁵⁴ For rejected grantees, such as Columbia University microbiologist Dr. Elvin A. Kabat, the loss of a sense of scientific community was palpable and long-lasting.⁵⁵ For NIH extramural administrators, the episode represented a compromise with political expediency. "I felt so unclean," Van Slyke recalled. Responsible as NIH Associate Director for Extramural Affairs for terminating "dozens" of grants between 1952 and 1955, Van Slyke left a remarkable testament about the cost of compromising his deep belief in the merit system:

Everything ran along fine until McCarthy started acting up, and then we would get instructions from our security officer that this grant headed by scientist number x, or a b, or whatever he was, would have to be terminated. Well, that of course would stop the research work and throw the whole team out of support just overnight, because they had to be stopped immediately.... I was the S.O.B. who said, 'If you will wire me today that you would change investigators — and I couldn't tell why, I was not permitted to tell them that he was the subject of security questions — and you'll have to recommend somebody else....' I swear I did that dozens of times....

We lived through those awful days of McCarthy influence without anything, save the protection I was able to give the research grant program from my desk. I

can tell you a good many times I felt like chucking the job. I felt so unclean.... A fellow had signed a petition or something, or had contributed two or three dollars to some cause. This just happened to be causes I would have contributed to, if I had any money. I would have thought that contributing to free Spain to get rid of the dictator, Franco, would have been a good thing because I'm opposed to dictators.... It was these kinds of people who got into trouble.... It was the most unfair sort of thing, and it wasn't until Mr. Folsom came in as Secretary that it stopped.⁵⁶

The negative political environment for biomedical research was dramatically reversed on April 11, 1955, when PHS pronounced the Salk vaccine effective against three types of polio. After publicly commending Dr. Jonas Salk on April 22, President Eisenhower moved toward accepting a larger Federal science role. With the discovery of 204 new polio cases among 400,000 children inoculated with NIH-licensed vaccine manufactured by Cutter Laboratories, a crisis ensued that thrust PHS into national pre-eminence and marked the last time private foundations and drug companies would be allowed to field test a biologic on a mass scale.⁵⁷ By moving aggressively to standardize and safety-test vaccine lots, NIH and the Communicable Disease Center restored public confidence in the immunization program and established a momentum in public policy that carried through the rest of the decade.

Like other PHS organizations, DRG was swept up into unaccustomed roles and public responsibilities in the aftermath of the Cutter vaccine crisis. An enormous number of rhesus monkeys were needed to produce and test a polio vaccine, but the Government of India embargoed exports after a shipment of 1,000 animals landed in London with only 600 still living.⁵⁸ DRG Chief Allen was drawn into State Department and National Research Council discussions on the rhesus monkey shortage to ensure

supplies to PHS grantees outside the polio programs. Working with a committee of PHS consultants chaired by John Hopkins cardiologist E. Cowles Andrus, the Division conducted a nationwide survey of rhesus monkey requirements and calculated that 166,107 animals would be needed for FY 1956, the great preponderance for six pharmaceutical houses preparing polio vaccine.⁵⁹ Dr. Van Slyke flew to New Delhi with a State Department mission that negotiated a new importation agreement. DRG Chief Allen managed implementation and coordination with the vaccine producers. Among the outcomes were a PHS program to ensure humane care for subject monkeys and emergency construction of a monkey quarantine facility on the Bethesda campus.⁶⁰

Another harbinger of change was the upsurge in congressional interest in basic research, focused on the "backlog" of unpaid meritorious applications that had been steadily mounting since 1950. The issue was catalyzed quite inadvertently during preliminary contacts by the second Hoover Commission, which was conducting the Administration's first survey of Federal research problems. In April 1955, while recuperating from back surgery, Senator John F. Kennedy (D-Massachusetts), a member of the Labor and Public Welfare Committee, sent inquiries to the Division through his father, Joseph P. Kennedy, then serving on the Hoover Commission.⁶¹ Sensing a political opportunity, Chief Allen confirmed that 274 meritorious applications totalling \$2,699,900 went unpaid in FY 1955 and that 723 grants worth \$7,363,800 were expected to be unfunded in FY 1956. Allen also supplied the Commission and Senator Kennedy's office with specially annotated summary statements for the Appropriations Committee's use in justifying a large-scale increase in the basic research budget.⁶² Strongly supported at Senate Appropriations hearings on May 18, Kennedy proposed raising the FY 1956 NIH research budget from \$35.5 million to \$39.5 million. The addition carried, but, fueled by a rising volume of applications, the backlog grew to an estimated \$10,391,000 by October 1955. This set the

stage for the massive 100 percent correction that would be appropriated for FY 1957.⁶³

The onset of the new biomedical era came with a rush of legislative enactments in the 12 months following James Shannon's appointment as NIH Director on August 1, 1955. Other key players were Senator Lister Hill, Health Subcommittee chairman on both the Appropriations and Labor and Public Welfare Committees; Marion B. Folsom, incoming HEW Secretary; and Mary Lasker, a lobbyist with extraordinary personal influence on medical policymakers. After suffering a heart attack in September 1955, Eisenhower began backing away from fiscal conservatism. However, the health committees were far ahead of the President in terms of spending requirements, and when the Administration proposed a comprehensive health program in October, the Senate Appropriations Committee dismissed it as "wholly inadequate."⁶⁴ Instead, the Committee doubled the total NIH budget, raised extramural spending from \$55.6 million to \$123.1 million, and appropriated \$30 million per year for 3 years for health research facilities construction. The catchall Health Amendments Act provided funding for traineeships, while budget supplementals brought the Division \$200,000 to administer the nationwide health facilities building program. Other new responsibilities included the administration of nurse training programs, which was added to the appropriation for nursing research first received in 1955.⁶⁵

The momentum of change set up by these enactments unsettled every aspect of institutional life at NIH. At the March 9, 1956, meeting of the Executive Committee for Extramural Affairs, Allen reported that application volume had increased 40 percent, overtaxing duplicating facilities and requiring immediate staff expansion in all extramural program areas. The space shortage for the campus as a whole was assessed as "grave" in the quarterly report sent to Secretary Folsom in June. Provisions were added to the final budget supplemental in July for architectural

work on a major office building, on animal quarters convertible to office space, as well as permanent structures for the Dental Institute and the National Library of Medicine.⁶⁶ Portending a more hectic workstyle ahead for study section members, ECEA received its first proposal for homework compensation in October.⁶⁷ Similarly, a communications gap developed between the executive secretaries and the Institutes' program branches, particularly in regard to stimulation activities, in which the Institutes now played a more dominant role.⁶⁸

Shannon's objectives for the extramural program in the expansion period focused on manpower training, facilities construction, and experimental adaptations with "large research grants, for long periods of assured support, for investigators in broadly defined areas under the guidance of outstanding investigators".⁶⁹ The larger challenge for the DRG review system was to incorporate program grants, center grants, and other variants of institutional grants developed by the Institutes since 1952 into the grants economy. Already the primary growth area, program grants in FY 1956 amounted to \$7,344,2155, or 19 percent of the NIH research budget, with significant expansion from the FY 1956 level of 273 grants expected. But because program grants bundled several investigators into each application and omitted the detailed focus on technical concepts and procedures, which was the hallmark of traditional project grants, study sections lacked review criteria, and most extramural administrators were unwilling to expand their use.⁷⁰ All agreed, however, that an evolutionary process had begun, the outcome of which would have general acceptance.

Allen's approach was to strengthen the extramural system internally, through program development focused on noncategorical areas. The Long Report, the Department's first survey, recommended severing the extramural system from NIH and creating a new agency and council at HEW.⁷¹ Vigorously contested by Sebrell and the OPR staff for its inadequate informa-

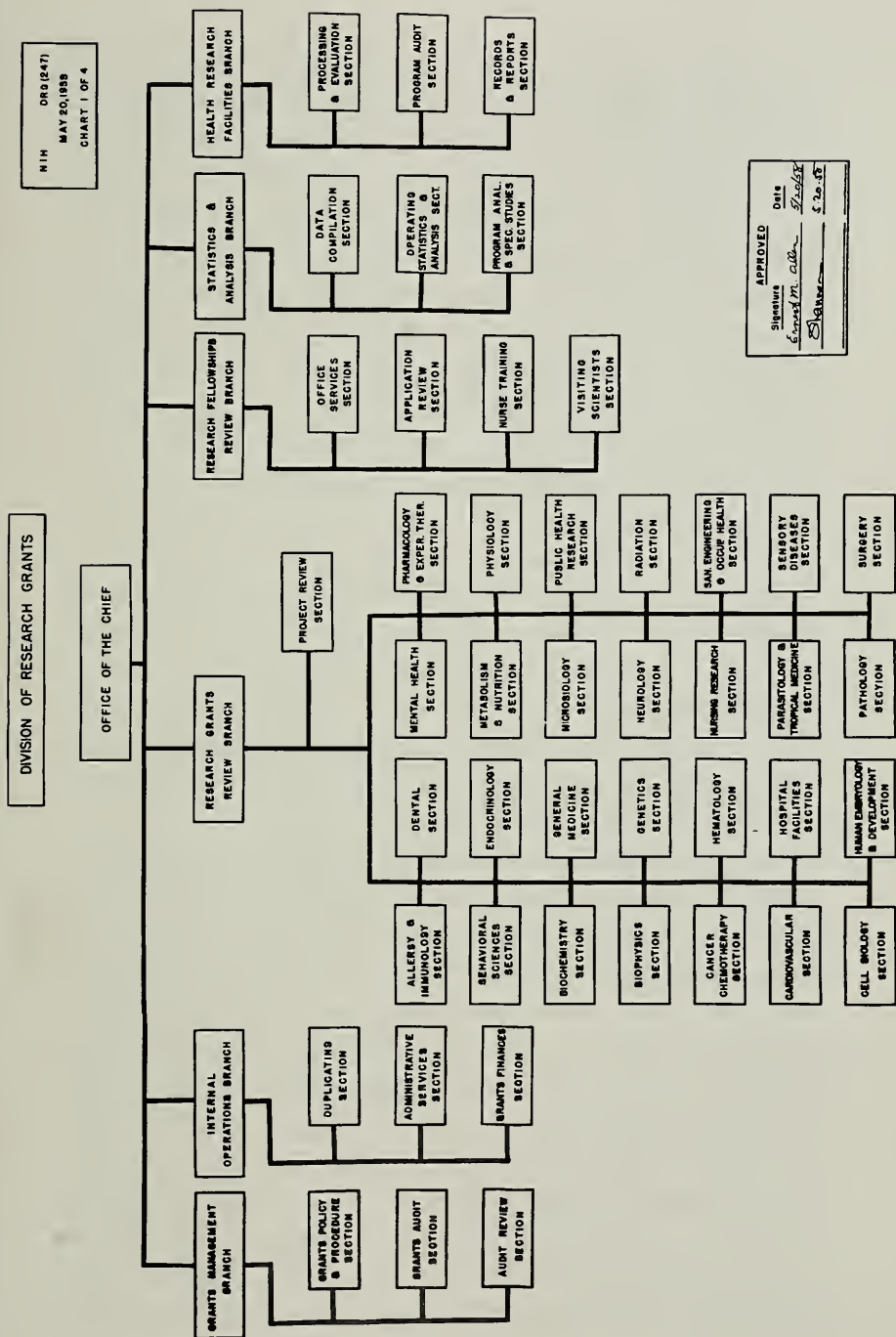
tion base, the Long Report was set aside in 1955 by Secretary Folsom. The Department then commissioned a second study by Stanhope Bayne-Jones, which proved to be more positive to expansion and the new institutional grant mechanisms. What was clear at the start, as Secretary Folsom assured President Eisenhower on July 19, was that the shape and rate of expansion would at all times be governed by “the need for maintaining the same high standards which are now in force” for both review and research.⁷²

2.3

Riding the Flood: The Division Adopts New Roles and Mechanisms in an Era of Dynamic Growth, 1957 - 1960

There was no peacetime NIH precedent, nor comparable sequel, for the growth surge that ensued upon passage of the final installment of the FY 1957 appropriation on July 31, 1956. Within 4 years, the NIH budget ballooned from \$98.5 million to \$400 million. Appropriations grew at a 44.2 percent annual rate, more than triple the rate from 1950 to 1956. The growth was steeper — 56.3 percent — for extramural appropriations, without counting the annual \$30 million earmarked for research facilities construction, which lifted the total from \$55.6 million in FY 1956 to \$322.6 in FY 1960.⁷³

For the Division, budgetary expansion generated a burst of new and renewed extramural activities, as universities, medical schools, and hospitals competed for large-scale institutional grants. The volume of competing research project applications reviewed by study sections swelled from 2,750 to 7,975, the number of study sections increased from 21 to 33, and the size of the average request grew from \$12,587 to \$19,446.⁷⁴ Administratively, a compact organization with a complement of 128 and a professional staff largely limited to its executive secretaries, was transformed into a complex hierarchy with five operational branches and 360 full-time positions.⁷⁵



19. DRG Table of Organization, May 1958.

Attendant upon the FY 1957 appropriation were a number of enactments requiring direct DRG administration of mandated programs, the largest of which was the Health Research Facilities Program, authorized to dispense \$90 million in matching grants over 3 years for university and hospital construction projects. Based on careful cultivation of university interest in construction subsidies since 1952, the Division organized an Advisory Council and presented its first meeting with 31 applications totaling \$22,138,891, all within 60 days of enactment.⁷⁶ A model of efficiency in the rapid disbursement of peer-reviewed large sums, the program operated through a specially activated DRG branch, whose staff conducted 350 site visits over the next 3 years, processed progress reports, and ensured compliance with geographic distribution requirements.⁷⁷ Among other directly administered programs were the General (Basic Science) Research Training Grants Program, which awarded stipends in preclinical fields, and the Senior Research Fellowships Program, which supported M.D.s for up to 5 years of clinical research.⁷⁸ These joined existing DRG administration of grants programs in nursing and air pollution, the fundamental programming for which came from PHS Divisions outside NIH.

With the sudden removal of fiscal constraints, the Division made substantial progress in what Allen construed as its primary mission: stimulating development of new scientific fields basic to medicine. One leading focus was the emerging field of biophysics, where the use of electron microscopy and x-ray crystallography was elucidating fundamental molecular structure. Allen helped Francis O. Schmitt, chairman of the Biophysics and Biophysical Chemistry Study Section, procure a 4-year, \$600,000 "program grant" from the Health Council for a series of lectures and conferences intended to establish a place for the field in college and high school curricula.⁷⁹ The Morphology and Genetics Study Section set out to catalyze the field of cell biology by promoting center grants, founding a national journal and national society, and even

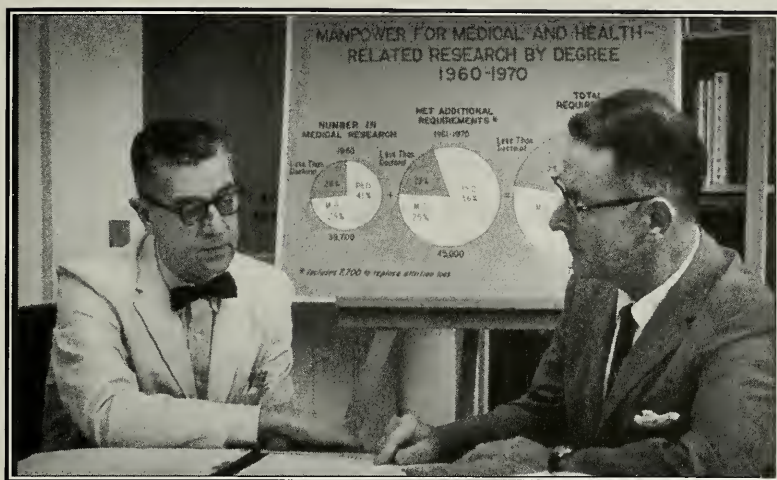
agitating for the establishment of a separate Institute.⁸⁰ The Cell Biology Study Section was split off in 1958, and a network of a dozen working groups of university-based researchers was organized, one of which was awarded a large center grant.⁸¹

In 1957, the Division also promoted research in fertility and reproduction, toxicology, and air pollution as part of its special focus on noncategorical investigations. The General Research Grants Branch, headed by Dr. Dale R. Lindsay, attempted to identify such "gap" areas and induce investigators to develop long-term projects. Here, promotion efforts by themselves proved unavailing. Congress, while espousing basic research as a national issue, consistently neglected to fund it, and the advisory councils of the Institutes customarily downgraded noncategorical applications. Allen did not succeed in obtaining a separate funding line, through DRG, for general grants, but he did obtain \$1.2 million from the Institutes for FY 1958 funding, and he also was able to set up study sections covering most of the new research areas.⁸²

Apart from these exercises in direct and indirect management, the Division also engaged in informal program development with regard to clinical fields. Here, the principal focus was on radiation therapy and radiobiology. Significant advances in radioisotope diagnostics, combined with public fears about strontium-90 poisoning from above-ground atomic testing, gave the Radiation Study Section a prominent public role in 1957. Advising the Health Council that further atomic tests would require limitations on milk consumption, the study section organized a nationwide series of cooperative clinical tests for radioisotope therapies, and it also established dose standards to facilitate clinical applications.⁸³ Because so many clinical specialties had begun using radioisotope diagnostics, Allen brought in a leading PHS clinician, Dr. Clifton C. Himmelsbach, to head the Grants Review Branch, into which all the study sections had been grouped, and to serve as Medical Advisor for the Division. In his brief tenure (1957 to 1959), Himmelsbach organized a conference

series on leading clinical issues, established review procedures covering 122 ongoing projects related to radiation health, and developed human exposure safeguards for radioisotope experiments. Himmelsbach also introduced the use of the special ad hoc committee, an expedient technical review by former study section members and other occasional consultants, which relieved councils of the burden of special review.⁸⁴ Special study sections quickly became an essential feature of DRG review cycles. They were used to review applications that did not fit into areas of established expertise, to manage application flows that exceeded the capacity of standing review groups, or to avoid conflict of interest.

The conditions of rapid and uneven development characteristic of the 1957-1960 period ensured that reorganization within the Division would be a virtually continuous process. Surging workload requirements in the first expansion year jeopardized administrative control and gave ORP observers reason to believe that DRG review statistics were no longer reliable.⁸⁵ In April 1957, Allen proposed expanding the Division's program analysis function and its administrative capabilities and coordinating responsibilities in noncategorical research areas. Shannon's preference, however, was to upgrade ORP extramural management activities and to develop program coordination through ORP as well as a centralized data processing function for NIH as a whole.⁸⁶ In October, with Shannon's firm backing, ORP added staff for program development and began surveying DRG working sections and Institute grants branches to reapportion organizational functions within the extramural system. The survey group's interim report, circulated in January 1958, proposed a thorough "regrouping" of DRG administrative functions to create a viable staff structure and to considerably enlarge its service activities. The position of DRG Executive Officer, organizational concept of the Statistics and Analysis Branch, the Administrative Branch, and the principle of joining referral and review functions are all traceable to the survey's findings.⁸⁷



20. NIH Director James A. Shannon with Joseph S. Murtaugh, Chief, Office of Policy Planning, about 1958. Courtesy of the National Library of Medicine.

The pace of extramural reorganization slowed in the spring 1958, as the Administration tried to enforce a no-growth fiscal policy aimed at consolidating the FY 1957 spending gains. In June, a high-level DHEW advisory committee, headed by Dr. Stanhope Bayne-Jones, recommended a policy of “excellence rather than growth.” The Committee’s report also endorsed the emerging varieties of institutional grants and advised that “a steadily increasing proportion of the research grants budget of the National Institutes of Health be available for program grants.” Shannon, who had personally selected Bayne-Jones for the survey, enthusiastically adopted the findings about program research and slow growth. Convinced by previews, Shannon directed in April that organizational changes at DRG would be undertaken “in a step-wise fashion.”⁸⁸

The first step, which went into effect on July 16, 1958, was to separate noncategorical basic research, expected to grow from \$5 million in 1956 to \$30 million by 1959, into a new division, General Medical Sciences (DGMS), with its own professional

staff and funding line. The transfer allowed the Division to focus efforts on peer review and on the newly created Statistics and Analysis Branch, which the Department, under congressional urging, envisaged as "a broad intelligence function for the extramural programs of the NIH."⁸⁹ Program activities for preclinical research areas were also transferred to DGMS, leaving room within DRG for intensification of grants management functions, such as auditing, paying, and processing grant and award funds, and recording all grant and award actions.

When Dr. Allen Treloar came on duty as the first Statistics and Analysis Branch Chief in February 1959, his charge from Shannon and his advisors was to develop a "central source of information" from extant DRG records. The advent of automated data processing made centralized recordkeeping seem just over the horizon, and in May the Branch embarked upon a long-term program to adopt existing grant and award records to the IBM 650 model computer and IBM punch card data systems.⁹⁰ To stimulate research in the application of emerging computer technology in biomedicine, DRG sponsored a new study section, the Advisory Committee on Computers in Research, which held its first meeting on September 20, 1960.⁹¹

The net effect of these organizational changes was to shift the Division toward centralized service functions, to diminish its responsibilities in extramural policy formulation, and to transfer the ambit of its authority from PHS to NIH. Chief Allen ceased to chair Health Council meetings during consideration of general research grants and instead took up a new role as Extramural Policy Advisor to Dr. Shannon.⁹² With congressional approval of institutional grants in August 1960, individual research projects took a back seat as the agenda DRG had been preparing since 1951 was rushed into being. The fastest growing institutional variant, the training grant, reached \$90 million in 1960. Transferred to DGMS in 1958, responsibility passed back to DRG in 1960 for coordinating Institute training programs and for

providing scientific assistance, receipt, referral, and auditing services.⁹³ In recognition of the Division's success with health research construction grants, Allen was made director of a senior advisory group, which oversaw pilot studies for clinical research centers and regional primate centers. DRG was called upon to set up review panels and conduct reviews for clinical research centers. Some DRG representatives protested regulations prohibiting applications from individual investigators, but the Division's leadership as a whole accepted the new rules as the most expedient way to advance medical research.⁹⁴

In repositioning itself as "a check point on . . . the pulse of nationwide research and research training programs," the Division and its personnel endured a workload buildup, which the 1960 Annual Report described as "staggering." Grant audits fell several years behind schedule, while applications assigned to a special study section grew to 13 percent of the total received. Fellowship applications doubled between 1958 and 1960, competing applications reviewed by study sections increased from 2,750 to 7,975, and the number of site visits increased from 113 to 533 during 1956-1960.⁹⁵ Staff expansion was limited by the severe space limitations in effect at Building T-6. When rental space opened at the Robin Building in Silver Spring in early 1959, a diffusion of work units began, which further complicated administrative cooperation and control. A new office building had been authorized in 1956 for the extramural programs, but an 800 percent rate of growth in all extramural personnel since that year had outstripped the capacity of the new building by fall 1959, before construction had even begun.⁹⁶ The decision was taken, therefore, to relocate the extramural programs as a bloc to a site off the Bethesda reservation.⁹⁷

The cycle of growth that peaked in 1960 also had a substantial downside, primarily in the area of grants administration, which no longer served to assure Federal control over appropriated research funds in the greatly expanded research economy. In

February 1959, the General Accounting Office detailed significant lapses in PHS authority for monitoring the transfer of unexpended grant balances and the accumulation of advance payments by grantee institutions, as well as in grantee equipment purchasing and the Division's conduct of grant audits. On a more symbolic level, the GAO challenged the use of Chairman's Grants to pay administrative expenses of the study sections.⁹⁸ The scientific largesse from which the "free money" concept had been derived at the beginning of the growth cycle in 1948 was clearly no longer universally acceptable on the Government side of the Federal science partnership.

2.4

Grants Peer Review Matures in the Era of Ernest Allen: Dual Review, Institutional Grants, and the Presidential Criteria, 1951 - 1960

Peer review responsibility at NIH in the initial postwar period was collegially shared by the National Advisory Health Council and DRG, under the ultimate authority of the Surgeon General. Joint efforts to establish uniform review procedures began in 1948 with agreement on a standardized summary sheet and a priority rating system originated by a Health Council subcommittee.⁹⁹ Thereafter, the pattern of operating responsibilities became more diffuse and complex.

First formalized in the October 1951 operating guidelines of the ECEA, the system of dual review worked through a slowly evolving interrelationship between executive secretaries, advisory councils, and Institute program branches. Generally, executive secretaries were responsible for scientific review, and Institute grants personnel were responsible for organizing the council meetings. The two functions were to be performed separately, although exception was made for the Mental Health Institute, where the study section executive secretary was also responsible for Institute grant activities.¹⁰⁰ Policy was implemented through the

Executive Committee on Extramural Affairs, with Dr. Van Slyke, the Associate Director of Extramural Affairs, as chairman, and Chief Allen as vice-chairman. Such policies as developed by this forum served as the Division's primary means of regulating peer review. By 1959, dual review had become an NIH-wide mandate, and all preliminary review committees were under the Division's jurisdiction.¹⁰¹

Initial development of review procedures was largely individualized, reflecting the particular needs of each study section and the Division's commitment to administrative *laissez-faire*. The process of standardization began in June 1950, when study section recommendations were first interdigitated on a master priority list for the Health Council. Priority ratings on a 1-to-5 scale, which allowed payment of grants in order of appraised merit, were quickly adopted by the Cancer and Mental Health Councils. Study sections also introduced the referee system, whereby each application was assigned for intensive review to two members with the requisite background, who would present and critique the proposal, suggest a preliminary rating, and then lead discussion at the meeting.¹⁰² These innovations enabled the Health Council in 1952 to report reviewing "several hundred applications in only a few hours, by taking bloc action" on previously categorized and prioritized recommendations.¹⁰³ As the workload intensified, however, the study section review process became constrained by time pressures. Research design became more sophisticated, and applications typically spread over 6 to 8 continuation pages. Meeting time was completely taken up with project discussions, such that summary statements could no longer be composed immediately after each discussion, but were generated after the meeting adjourned.¹⁰⁴

Successful implementation of the standardized rating system marked the onset of a mature review process. From his ECEA position, Allen worked to broaden areas of procedural uniformity in the major grant and award programs, usually by extending DRG administrative responsibility. Formal delegations of

authority to the Division by February 1955 covered paying Chairman's Grants and noncategorical research proposals, substituting principal investigators, and transferring funds between budget categories. Innovations included a trial program for small grants, a 5-year support period, which reduced the frequency of renewal requests, and specialized review inside DRG for proposals not within the range of study section interest or competency.¹⁰⁵ The Division maintained grant files for three categorical Institutes and experimented with multiple referrals of noncategorical applications.¹⁰⁶

Beginning in 1955, the extramural system's second expansion cycle brought more changes. Fellowships and training grants grew at a faster rate than investigator-initiated research projects, and in combination with facilities construction, the former accounted for the major portion of awards paid for FY 1956.¹⁰⁷ Training grant applications, like other non-traditional applications, paid larger awards and were evaluated by different criteria — particularly administrative considerations such as budgetary strength, facilities assessments, and staff competency. The Division fielded five training grant review committees in 1956, as well as an advisory council for construction grants. Most review activity and manpower, however, remained focused on research project applications, which grew in volume from 2,750 reviewed in FY 1956 to 7,975 reviewed in FY 1960.¹⁰⁸ To handle the increased workload, the number of study sections increased from 24 to 33, and additional members were added to various study sections. Primary reliance continued to rest on consultants' willingness to take on larger, more complicated workloads. Study sections by 1960 were spending an average of 2.6 days per working meeting, up from 1.8 in 1956, and the number of applications reviewed per working day rose from 25.6 to 31.0 on average. The Division also began to strengthen staff assistance to study sections. Executive secretaries were limited to one study section, and new hires were required to have scientific compe-

tency requisite to the study sections' field of interest. A decision was also made to hire 20 Grants Technical Assistants as support staff to facilitate study section administration.¹⁰⁹

Allen and Lindsay believed that the key to managing this growing complexity of program and project applications was to ensure the quality of the review process. This was reflected in the approval rate, which fell steadily from 65 percent to 51 percent for all councils during FY 1956-1960. Allen realized the need to tighten the criteria for approval, and in January 1958, he circulated a new voting procedure, which mandated detailed council review for proposals with priority scores of 400 or poorer and for applications from study sections with approval votes of less than 75 percent.¹¹⁰ Confident that councils would disapprove a third of the lowest tenth of recommended applications and that split votes in study sections would diminish, Allen anticipated the imposition of "Presidential Criteria" by the White House on August 14.¹¹¹ President Eisenhower accepted dramatic increases in the FY 1960 PHS budget on the condition that review quality be maintained as the volume of applications rose. Allen's projection was accurate, for the study sections reported a 43.2 percent approval rate for the 1960 fall meetings. The implications for future grants policy were analyzed in an article the Division published in *Science* in November 1960.¹¹² As funding became more abundant, disapprovals began to outweigh approvals, providing evidence to congressional committees of more stringent review standards. Close analysis of 605 disapproved applications from the 1959 spring round revealed study section findings of inadequacy in terms of projected data yield. This meant to Allen that "a verdict equivalent to 'this research is not necessary' has a high rate of occurrence." Henceforth, efforts to maintain quality in scientific review would address generic deficiencies in grantee submissions and assume less than 50 percent approval.

In 1960, as the Division moved tentatively out into a scientific world defined less by individuals than by institutions, Chief

Allen was confident that “strong underpinnings for a still stronger medical research effort” had been established. The extramural system could triple in size during the coming decade, but it need no longer be driven primarily by project grants. The Division’s recommendations for the FY 1960 budget augmentation of \$351.2 million was split almost equally between \$182.4 million for research grants and \$180 million for training, control, and facilities construction. The research allocation was deemed sufficient for paying “roughly half of the new research grant applications estimated for favorable recommendation” in 1960.¹¹³ The study sections were projected to reach 50 by 1965, a growth rate of three per year, without lowering review standards. “The current system of review can be maintained effectively for the predictable future,” he assured the Surgeon General in February 1960.¹¹⁴

On November 16, 1960, Chief Allen was reassigned to the Office of the NIH Director, and was succeeded by his deputy, Dr. Dale R. Lindsay, a Comissioned Corps entomologist with service in the Malaria Control Program. Allen left behind a strong legacy of personal service and a leadership style devoted to facilitating Government/private sector cooperation.¹¹⁵ His tenure spanned the Division’s most vigorous years and the most critical period of its institutional development. The transition from project grants to institutional grants as the extramural priority was epochal in scope. By the end of the decade, extramural activity focused on program-projects and centers rather than on individual investigators. A growing subset of nontraditional applications was being evaluated as much by “administrative adequacy” as by scientific merit.¹¹⁶ A new national commitment for scientific manpower development had arisen to compete with the conquest of disease for the minds and the resources of science administrators.

Allen’s achievement — and that of the first generation of NIH extramural leadership — was to have created an administrative support structure responsive to the needs of a scientific community that was still in the process of defining and organizing

itself. Their larger accomplishment was to have successfully managed the transition out of the old scientific politics of individualism and into a new scientific politics of modernization and institutional growth.¹¹⁷ Biomedicine in the 1950s was still a tenuous and unproved relationship between clinical medicine and the biological sciences, and the task of administrative leadership was less one of bringing that community into existence than of allowing working scientists a larger role in evolutionary change.

“Bring on the Billion Dollar Program!”:

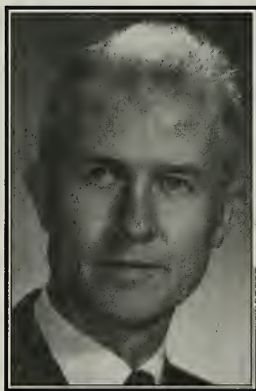
Extramural Transformations and the Rise of Program Science, 1960 – 1968

During its formation and operation to a rather recent date, the administration of the extramural grants program of the Public Health Service thrived upon informal and flexible management tailored to the needs of the moment and dedicated to scientific freedom. . . . Now the program is relatively mature. . . . The size, the diversity, and the complexity of interrelationships between program components in themselves now demand the best in administrative management. We must achieve a unification of management policies and procedures throughout the Service's programs, and we must make these policies and procedures available to government administrators, institution officials, and scientists alike. In effect, the program is now of age, and the responsibility for more complete organization is upon us.

Dr. Dale R. Lindsay,
December 11, 1961¹

*T*he Division entered the 1960s on a wave of optimism generated by record congressional spending on biomedicine and the election of a science-minded President, John F. Kennedy, who was prepared to implement the infrastructure development agenda worked out under the leadership of Ernest Allen and James Shannon in the previous decade.² On November 16, 1960, when Dr. Dale Lindsay became the third DRG Chief, the vastly expanded landscape of American science called out for imaginative innovation on a grand scale. That landscape was composed in

roughly equal measure of traditional, small-scale “project” research, initiated by single investigators, and “institutionalized”³ or program research — large-scale, collaborative enterprises of groups of investigators, directed towards specific disease problems, manpower training goals, requirements for resource centers, and general research support of medical institutions. Program research was clearly ascendant, and the training of scientific manpower was emerging as the new national mandate in biomedicine.⁴ The scope of extramural activities had widened to include supporting medical school expansion, opening regional clinical centers and primate centers, conducting large clinical trials, and developing the various institutional interests of the PHS Bureaus.



21. Dr. Dale R. Lindsay,
Chief, Division of Research Grants, 1960 – 1963.

Shannon’s approach to extramural development relied heavily on program development from the Institutes and the Office of the Director, NIH. In his view, funding and administration took precedence over scientific review in “broad grants” where “all or part of the work to be supported...will usually be currently financed by a number of grants from a number of sources.”⁵ Lindsay and his successors, schooled in the project mindset of the

1950s, posed a strong counterpoint to the program emphasis. By crafting pragmatic administrative mechanisms, Lindsay sought to preserve the traditional separation between policy and science issues, which was at the heart of dual review. Beginning with the program-project grant format introduced in 1961, the Division experimented with hybrid mechanisms that filled the new institutional roles while retaining a strong review function utilizing non-Federal investigators as consultants.⁶

The evolution of the grants mechanism from research projects into program variants required by scientific expansion and emerging biomedical technology was a critical challenge that Dr. Lindsay and his professional staff accepted with expectations of expanding the Division's extramural leadership role. Reorganization of DRG on March 15, 1961, reaffirmed the Division's primary responsibility of "formulating plans, policies, and procedures" for administering NIH grants and awards. Similarly, establishment of the Inter-Bureau Advisory Committee for Extramural Programs on November 16, with Lindsay as Chairman, extended the

POSTWAR DEVELOPMENT OF NIH PROGRAMS

THE INITIAL SHAPE IS FORMED, 1945-1950

- PHS Act (1944)
- NIH acquires OSRD contracts
- division of research grants
- first training grants
- categorical institutes—heart, dental, mental
- "omnibus act"—arthritis, neurology, microbiology

THE FRAMEWORK FOR ACTION CONSTRUCTED, 1951-1955

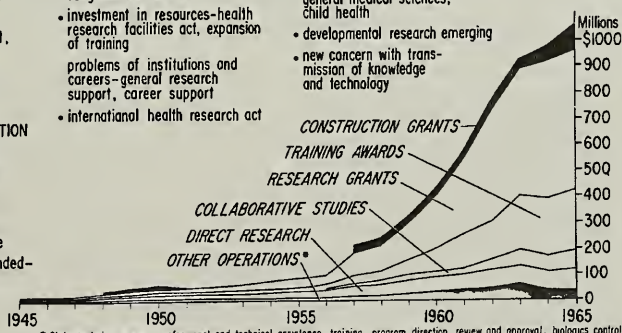
- development of extramural policy and procedures
- shaping of advisory and review framework
- emphasis on basic science
- intramural programs extended—clinical center, biologics standards

THE YEARS OF GROWTH, 1956-1960

- the deficit in research support overcome—Folsom policy, Bayne-Jones report, congressional action
- investment in resources—health research facilities act, expansion of training
- problems of institutions and careers—general research support, career support
- international health research act

THE EMERGING MATURITY, 1961-1965

- policies and procedures assessed
- program framework rounded out—research facilities and resources, general medical sciences, child health
- developmental research emerging
- new concern with transmission of knowledge and technology



Division's purview to new programs being fielded by the PHS Bureaus of Environmental Health and Community Health Services.⁷ At stake was the major extramural growth area — awards exceeding \$100,000 — in which the dollar amount requested of applications had doubled over FY 1960-1961. Larger awards accounted for 27 percent of the dollar amount requested in all research applications received in the spring of 1961, a harbinger of massive flows to come.⁸ The Division staff prepared procedural modifications to accommodate the 40 percent increase in applications that year, and overall the feeling was upbeat. Assessing NIH research accomplishments since 1946, Allen and Lindsay pointed with pride to 46,700 extramural projects, 50,000 published papers, and \$1 billion in peer-reviewed awards as a solid basis for new clinical advances in the conquest of diseases. Facing a five-fold increase from the 1960 award level of \$199.2 million by 1970, the professional staff continued to express "restrained enthusiasm" for applied research breakthroughs. "Bring on the billion dollar program — we can handle it," Administrative Officer Gilbert I. Frey advised Lindsay in summarizing review workloads projected for another decade of growth.⁹

3.1

High Point of the Cooperative Approach: Dr. Dale R. Lindsay and the Problem of Grants Management, 1960 - 1963

The year 1961 was a good beginning in a number of ways. After 5 years in the planning stage, the Office Building (Building 31), which was to replace T-6, finally neared completion. In March 1960, DRG staff had begun moving out of T-6 offices, settling temporarily in rented buildings in Bethesda and neighboring Silver Spring. Displacement was accompanied by rapid staff expansion as the Division increased its permanent workforce from 269 in 1959 to 432 in 1961.¹⁰ Permanent quarters were promised in the first four floors and two basement levels of



23. Building T-6, shortly before demolition in the fall of 1961.
DRG staff relocated to Building 31 B-Wing (right, rear).

Building 31, opposite Institute staff offices in the South Wing. Dr. Lindsay felt secure enough in this arrangement to have current DRG publications deposited in the building's cornerstone in November 1961. By the end of that month, the transfer was completed, following which T-6 was demolished to make room for a parking lot.¹¹

Components of the Statistics and Analysis Branch, however, remained in rental space in Bethesda. Building 31 quickly proved inadequate to house the Division plus Institute grants branches and the Division of General Medical Sciences, which was raised to Institute status in January 1963. In June 1963, the Division decamped again to take up new rental quarters in the Westwood Building, an off-campus facility shared with extramural staffs of several Institutes. Westwood became the Division's home for the next 32 years.¹²

The Division under Dr. Lindsay began developing a complex professional staff structure capable of coordinating and servicing the full gamut of PHS grants and awards programs. Key staff specializations emerging in this period were scientific evaluation, public information, data processing and analysis, and post-award

administration.¹³ The March 1961 reorganization established eight branches, two of which serviced institutional grants — the Special Program Review Branch for initial review of center grants and program-projects, and the Career Development Review Branch for review and administration of training grants, fellowships, and awards to research faculty.¹⁴ During 1961, the Research Grants Review Branch created 5 new study sections, bringing the total to 42. The subject areas — Accident Prevention Research, History of Medicine, Primate Research, Surgery, and Pathology — suggest that new research interests were being developed outside of clinical research. This is also true of Lindsay's choice of Deputy Chief, psychologist and NIMH Executive Secretary Dr. Richard R. Willey, who replaced Dr. Clinton Powell, PHS clinician and radiobiologist.¹⁵ Personnel assignments were another index of shifting priorities. The Division deployed its growing workforce in areas other than peer review of project grants. Of the 163 new positions added during FY 1960-1961, the Grants Review and Grants Referral branches together received 18, while Statistics and Analysis, Career Development, and Grants Management received 128.¹⁶

The administrative style of the Division under Lindsay was a throwback to the cooperative individualism of the previous decade, in which full knowledge of operating procedures was held by a few key individuals, and procedures were "liberalized" to facilitate the rapid exploitation of scientific opportunities by grantees. In Division operations, the key players were often special assistants in the Immediate Office of the Chief, whose initiative, familiarity with procedure, and information-gathering ability were expected to catalyze particular activities in their assigned fields.¹⁷ Their working philosophy placed "brains management" before "book management," and their primary function was service, or "helping the investigator get on with the job." Practically speaking, this meant getting "the tools of trade into the hands of competent scientists, with a minimum of trauma and disregard, if necessary,

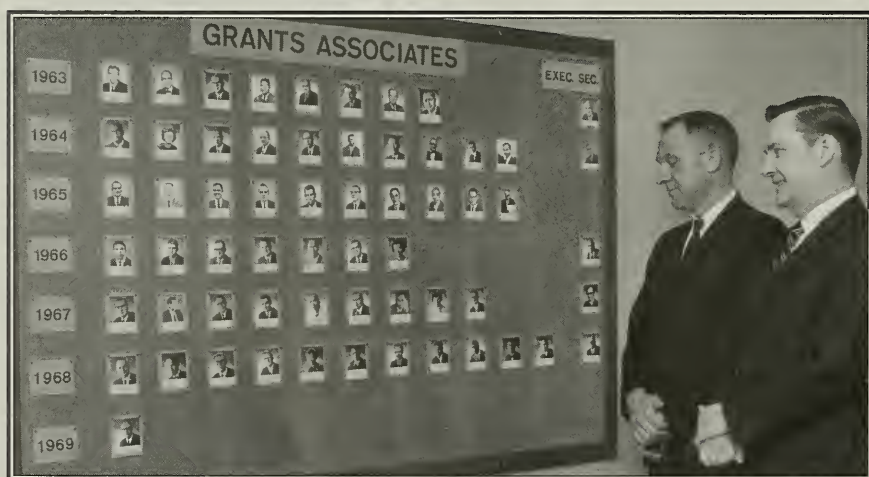
of administrative protocol.”¹⁸ The vital center of administrative work was providing personal contact with 12,000 grantees and 22 PHS Institutes and program divisions at the myriad points of award and post-award processing.

Despite significant staff expansion during 1958-1961, the Division remained “chronically undermanned” relative to its mission, according to DRG Deputy Chief Willey. The personnel system was stressed by workload pressures, driven by 40 percent annual increases in incoming applications, and administrators were preoccupied with what Dr. Lindsay called the “retail” aspects of grants management. One result was that the Division had to largely forego policy planning and development. After the reorganization that created the Bureau of Environmental Health and the Bureau of Community Health — with as many as 12 granting Divisions between them — in 1961, no ruling had been made on whether DRG would serve only NIH or all PHS bureaus.¹⁹ The study sections increased their programming activities during this period, exploring gaps between research fields and organizing initial efforts in emerging areas of specialization. However, the survey functions of the Advisory Councils had begun to lapse, and assessment of relevant scientific fields lagged behind the explosive expansion of research activity.²⁰

These administrative factors convinced Lindsay and his staff of the need for wide-ranging renewal of the entire extramural process. Asked by Allen, then NIH Associate Director, to propose changes in PHS grants management, Lindsay focused on three broad correctives: staff strengthening, automation, and a stronger PHS role for the Division. The detailed prospectus that went forward to the Executive Committee for Extramural Affairs (ECEA) on November 8, 1961, proposed shifting “retail” grants administration to the Institutes, establishing four regional field offices for DRG auditors and evaluators, and writing a new procedures manual for all PHS extramural awards programs. The change from project research to program research, the brief

argued, required more intensive extramural management: a “high caliber technical staff” and a locus of authority within the Grants Management Branch, DRG, which was to shape Institute programs and oversee their operations.²¹ An additional 20 positions were requested for this Branch, including 5 for a Policy and Procedure Review Office, which was to clear all extramural policy and be the sole issuance point for public dissemination of regulations.

Although the basic option of centralized grants management was rejected during the ensuing 12 months, the Division did successfully implement other features of Lindsay’s agenda, notably the reorganization of units responsible for fellowship and training programs into the Career Development Review Branch (CDRB) and the establishment of the Policy and Procedure Office in the Office of the Chief, DRG. The most unambiguous success was the Grants Associates Program, a 12-month management internship, which was intended to train scientific administrators to staff the growing extramural system. As initially proposed by Dr. Willey in September 1961, the program was to recruit Ph.D. or M.D. scientists at the GS-12 to GS-14 level who were “likely to



24. The Grants Associates Program. Dr. Confrey (right) viewing the directory of Associates with Dr. Carl Douglass, Chairman of the Grants Associates Board.

remain in extramural work and become key administrators in the future." The training involved seminars in extramural policy and operations as well as detailed management assignments "under the tutelage of an experienced staff member."²² Following ECEA approval in November, NIH Deputy Director David Price appointed a board of seven senior scientist/administrators who established the program guidelines. The training was to be individually tailored to cover a wide range of positions, and no intern could be used only as "another pair of hands."²³

The first Grants Associates Program Director, Dr. Dwight C. Monnier, supervised the selection of 10 candidates from over 100 applicants and also negotiated a contract with American University for the seminar series.²⁴ The first cohort of 10 associates, welcomed by Dr. Lindsay in September 1962, included two African-Americans, Dr. Thomas Malone and Dr. George Brooks, later leading extramural administrators, and one woman, Dr. Irene Miale.²⁵ On matriculation, seven received NIH staff appointments. The program generated a high degree of enthusiasm and became a rite of passage for numerous NIH administrators in the succeeding decades.

The Division's larger effort to establish review and post-award services for program grants yielded more problematic results. When institutional grants were finally authorized in the FY 1962 appropriation bill, which Congress passed in August 1961, new award programs were quickly launched by DRG and the Institutes according to a pre-arranged distribution of responsibilities. The Division of General Medical Sciences emerged with receipt, referral, and review responsibility for block or formula grants — now designated "general research support" — for medical and dental schools, while in the Special Program Review Branch, DRG was given award and post-award responsibility for program-project grants and center grants.²⁶ Spurred on by Shannon and Allen, the energetic Special Programs Chief, Dr. Gordon H. Seger, fielded six program-project committees, and these reviewed 49 applications requesting \$74,315,921 for the

November 1961 round of Council meetings. Three more committees were organized during 1962.

To maintain an objective dual review, Dr. Seger kept these evaluations "relatively free from Institute program considerations."²⁷ Compared to previous Division experience with Health Facilities Construction Grants, which had been handled by a single committee with great dispatch, the program-project review process tended to be protracted, more cumbersome, and without opportunities for Institutes to evaluate the program potential of the applicant. On site visits, the committees found themselves at cross purposes with the Institutes that had stimulated the applications. Administrative considerations inserted previously at the Institute's behest were often rejected by site visitors. Moreover, the committees had a low approval rate for the first round (18.3 percent), and nearly half the applications (22 out of 49) had to be deferred until lengthy, 2-day project site visits could be scheduled.

Willey took pains to work with the Institutes, allowing Institute observers to accompany the site visit committee and share budget information needed for audits.²⁸ However, committees complained that the substitution of administrative data for research project descriptions often resulted in inadequate technical reviews.²⁹ When the Division of Research Facilities and Resources was established in July 1962 to centralize the administration of general research support grants and to facilitate the awarding of construction grants and center grants, the Special Programs Branch lost its noncategorical responsibilities. The Institutes decided that the administrative difficulties experienced by program-project committees would be alleviated if initial review and program administration were more closely coordinated, and in October 1962, seven committees were transferred to their corresponding Institutes. Although the Branch was disbanded in the following year, the Division retained its interest in review of program-projects. The Arthritis and Metabolic Diseases Committee was retained by the Division until 1973; a second program-project committee, Child Health and Human Development, began operating in April 1964. In general, the review of

more mission-oriented special grants had become an Institute responsibility.³⁰

Another hallmark of the Lindsay era, the Research Career Program, reached fruition largely through special congressional action. The program originated in a recommendation of the Boisfeuillet Jones Committee that NIH fund 200 "research professorships" in medical and dental schools and university basic science departments in FY 1961.³¹ Congress appropriated \$2 million for this purpose in 1961, but the initial set of guidelines developed by the Career Development Review Branch foundered on unworkable salary restrictions and the lack of merit criteria in the selection process.³² To head off a General Accounting Office challenge, applications were returned, and the funds redeposited in the Treasury. The program was restarted in May 1962, and 306 Career Research Lifetime and Career Development (5-year) awards were made to new applicants by the end of FY 1963. New procedural guidelines, published January 1, 1963, underwent continuous review and revision, but the process of granting salaries still generated negative attitudes. Procedural adjustment kept the program going until the spring of 1964, when NIH announced a moratorium as the lifetime awards reached 236, an increase of 36 over the number originally earmarked by Congress. The net result, a "new relationship between the university and the Federal Government," wherein Government funds paid non-Federal salaries, was a significant expansion of the Federal science partnership.³³

3.2

A "New Look" in Grants Management: The Fountain Committee, Problems of Accountability, and the Advent of Automated Data Processing, 1962-1963

The political environment in which the new structures of biomedicine were to be built suddenly turned hazardous for NIH in the spring of 1962, when a subcommittee of the House

Committee on Government Operations, chaired by Representative L.C. Fountain (D-North Carolina), sharply criticized NIH for failing to implement fiscal control over grantees. The charges were unexpected, deeply resented, but not without merit.³⁴ During preliminary hearings in April and August 1961, Shannon had offered to add a budget analyst and assistant to each of the seven Institute grants branches, but only two analysts and four assistants had been hired by March 1962. Nor had NIH been responsive to the Committee's larger stipulation that DRG's audit capability be expanded to allow a "thorough review of each project's financial management" prior to award and at each yearly continuation. On March 1, 1962, only weeks before the second round of hearings, the NIH ECEA decided not to augment DRG audit capability and to reserve post-award fiscal management as an Institute and program division responsibility.³⁵ This action effectively ruled out the expansion program Dr. Willey had outlined in his November prospectus, which would have created four regional administrative centers as post-award adjuncts of the DRG Grants Audit Section. To the committee, Assistant Grants Management Chief Dr. Sidney B. Cohen could only explain, "this is a massive operation, sorely understaffed."³⁶

Whether increasing the staff complement of the Grants Management Branch from 54 to 115 would have sufficed to audit the more than 14,000 research projects listed in the *Research Grants Index* for 1962 is open to question. Dr. Willey, who preferred shifting audit responsibility outside the Division, was pessimistic. After accompanying a program-project site visit at the Harvard laboratories of noted cancer researcher Dr. Sidney Farber, Willey reported "any impression that NIH staff are going to maintain effective day-to-day surveillance over the plans and expenditures of such a grant, I feel, would be illusory."

Willey was especially disturbed over the site visit team's inability to evaluate grantee equipment or to pursue anomalies in grantee fiscal programming. Spending \$12 million over 7 years on

this grant was scientifically justified, he concluded, but certifying that "these funds have not been used for patient care or in 101 other technically inappropriate ways," as the Fountain Committee required, was clearly beyond DRG capabilities.³⁷ Willey remained convinced that DRG could play a central role in the revitalized extramural system, provided NIH adopted a "new look" on grants management. The Division's focus would be on formulating and coordinating policies and procedures — "wholesale" functions, as distinct from "retail" functions, such as the administration and fiscal control of individual grants, which would be taken up by the Institutes and program divisions.³⁸

The Fountain Committee hearings precipitated a rapid and complex evolution of administrative mechanisms in the extramural area. NIH Director Shannon presided over this evolution, exerting paramount influence toward the creation of an independent Federal science agency, a strengthened intramural program, and a new partnership with universities. His starting point was analogous to Willey's: "The institution receiving the grant should be in the best position to develop the administrative controls needed."³⁹ In Shannon's view, policing grant relationships could be left largely to the universities, with the proper oversight and training. This would leave NIH free to develop program capabilities and administrative procedures, which were at the heart of the grants management system.⁴⁰

Planning and implementing the new administrative structure was supervised by Dr. David E. Price, Deputy Surgeon General and head of the Inter-Bureau Directing Committee on Grants Administration. In discussions during May and June of 1962, task forces reporting to the Directing Committee applied the centralized grants management functions defined by Dr. Willey to a new undefined PHS venue, leaving the DRG Grants Management Branch with only caretaker responsibilities in a transition period. Locating grants management above division level, it was argued, allowed assignment of a "supergrade" manager and supporting

grades not normally justifiable at the branch level.⁴¹ The Directing Committee's final report, which circulated June 27, made Dr. Price's Inter-Bureau Advisory Committee for Extramural Affairs (IACEP) responsible for changing extramural policy and procedure, and it attached the Policies and Procedures Office, DRG, to the IACEP as a "secretariat." Fiscal accountability, the crucial issue for the Fountain Committee, was delegated to grantee institutions under the rubric "fund management."⁴²

A detailed implementing memorandum, developed by NIH Executive Officer Richard L. Seggel and circulated by Dr. Shannon on July 30, 1962, distributed "centralized" grants management functions among DRG, the Office of the Director, NIH, and the Office of the Surgeon General. The memorandum also initiated a critical "experiment with geographic dispersal" — a regional office in Boston. The Directing Committee proposed "completely separating" grants management from scientific review and arranged to transfer post-award service of individual grants to the Institutes and program divisions.⁴³ DRG's financial oversight responsibilities were limited to "general financial policy and procedural matters pertaining broadly to NIH grant and award programs."⁴⁴ From this point onward, grants management activities at NIH would be based in the Institutes.

The import of these changes began to be felt in November 1962, when Surgeon General Terry accepted Shannon's proposal that DRG "operating services" would be retained by the NIH Director's Office and that "grant management policy coordinating functions" would be conducted by the Surgeon General's Office.⁴⁵ Dr. Shannon's unrevealed concept, that NIH would henceforth serve as the "single manager for the entire service,"⁴⁶ reduced the Division to a staff adjunct and left it for the moment without an effective extramural policy role for the first time in its 17-year history. Left out of the decision, Chief Lindsay complained that DRG's proposed role was "too provincial" and that grants management was being reduced to fiscal management, despite the obvious

need for comprehensive administrative services. From his position as NIH Associate Director for Research Grants, Ernest Allen objected more strenuously that the Directing Committee had failed to establish Grants Management Branch authority in post-award activities or affirm DRG authority in the review and referral processes.⁴⁷ Most of these objections were met by the Directing Committee in a revised functions statement circulated on January 30, 1963, in which the Division was invited to enhance and develop its two major responsibilities — scientific review and grants management — and the Branch was charged with drawing up budgetary guides and a new fiscal policy.⁴⁸ Nevertheless, a trend had been set in motion that would result, by 1968, in the gradual elimination of all residual DRG grants management functions.



25. Dr. Eugene A. Confrey, Chief, DRG, 1963 – 1966, and Director, DRG, 1966 – 1969. Courtesy of Dr. Confrey.

Consensus on a “new look” in grants administration remained elusive during 1963, despite a steady strengthening of the programming functions of the Office of the NIH Director. The lack of progress did not frustrate Dr. Lindsay, who opted for early retire-

ment in June, just as the Division staff was abruptly uprooted from its quarters in Building 31 and transferred to the Westwood Building. Lindsay's successor, Dr. Eugene A. Confrey, was a health administrator with a statistics and humanities background, who had served with David Price on the IACEP.⁴⁹ Enjoying Dr. Shannon's confidence, Confrey brought with him as Associate Chief for Analysis and Statistics, Peyton Stapp, who was Chief OPP Program Analyst, as well as two staff sections, Operating Statistics and Design and Analysis, which had been detached from DRG's Statistics and Analysis Branch in November 1962.⁵⁰ In October, Shannon approved Confrey's proposal to develop an NIH scientific evaluation capability at DRG that would bring the "central data system" closer to fruition and develop a "systematic analysis of scientific accomplishment."⁵¹ The Division now had a new mission orientation, a redefined functional role in the extramural system and restored relations with extramural program managers in the Office of the Director, NIH.



26. Minneapolis-Honeywell mainframe computer, about 1964.
Courtesy of the National Library of Medicine.



27. Typist preparing sequential camera cards for the *Research Grants Index*, which tabulated some 16,000 PHS grants in the 1963 edition.

28. The Research Documentation Section *Thesaurus*, a compilation of about 8,000 subject headings programmed for the MH 800 computer. By 1964 this section had a staff of 65.



29. First generation of Automatic Data Processing (ADP) office technology in DRG Statistics Processing Section, about 1962. Paper tape captured coded data from applications; then machine-typewriters prepared work sheets, recommendations, resumes, and summary statements.

Underlying this organizational realignment were more fundamental shifts within the grants economy, as the annual NIH appropriations neared the \$1 billion mark and NIH became the largest Federal research patron for American universities. The ripening of computer technology for administrative applications and growing public demands for access to scientific information generated a boom in information services at DRG during 1963. Two events in October of that year represented a breakthrough: publication of the FY 1964 volumes of *Public Health Service Grants and Awards* ("Blue Books") on a Minneapolis-Honeywell (M-H) 800 computer acquired for DRG,⁵² and formation of the Computer Research Study Section, superseding the Advisory Committee on Computers in Research, chaired by Dr. Lee Lusted.⁵³ Thereafter, automated data processing gradually became the norm in biomedical administration, and the Division began fusing the managerial culture of the modern business enterprise to the culture of the laboratory.

The growth in DRG information publications since 1961, when the Blue Book first appeared, was exponential. Annual statistical surveys, such as *The Research Grants Index* and *NIH Data Book*, attained a PHS-wide reach. These surveys were complemented by nonrecurring special studies in subjects such as priority scores, fellowship stipends, and grant personnel.⁵⁴ Several interests evolved into permanent DRG staff activities. The Patents Office, charged with monitoring grant invention statements, grew out of surveys conducted in 1961 by Grants Officer Jane Knapp, and the Office of Research Accomplishments began with Dr. Errett Albritten's experimental information exchange groups, which circulated prepublication laboratory findings in emerging research specialties.⁵⁵ The growth of an evaluative function was also stimulated by widespread application of mechanical data-capture equipment throughout the awards processing system. These provided a statistical base for a PHS-wide machine-produced record system from which focused studies of PHS

research support in nine research subspecialties were drawn in FY 1965. Entries into this mechanized record began in December 1963, with training grant data formerly maintained by the Career Development Review Branch.⁵⁶

Automation enabled the Division to cope with its steadily rising paperflow, particularly competing and noncompeting research applications, whose volume jumped from 10,028 to 15,233 during FY 1962-1963 and then held steady for the rest of the decade.⁵⁷ However, from the point of view of the grants community, the rules and regulations entailed by automated records processing imposed new burdens on investigators. The centerpiece of the "new look" in grants management was the January 1963 issuance of the Grants Manual, a massive synthesis of procedures currently used by 22 PHS Institutes and program divisions, to which new regulations responsive to the Fountain Committee requirements were continually added.⁵⁸ Polled grantees registered strong objections to new PHS stipulations requiring quarterly "time or effort" reports, Institute permission for "significant" changes in research design, and return of "unused" grant balances to the Treasury.⁵⁹ Stung by hostile letters and articles in *Science*, NIH Director Shannon commissioned a 69-page rebuttal, which asked the scientific community to accept higher levels of public accountability as a condition of program management and to transfer to the universities some of their individualized values of scientific freedom.⁶⁰ The rebuttal was not published, and the issue was not resolved as the new grants regulations became official on January 1, 1964.

NIH acquisition of computer technology also had important implications for study section activities. The Surgeon General's 1961 directive to separate review and program functions had its first real test in July 1963 when the Advisory Committee on Computers in Research (ACCR) was directed to cease its stimulatory activities and disband. Always strongly independent, the ACCR, functioning as a study section under Chairman Lee

Lusted, had been promoting the establishment of widely dispersed biostatistics centers as biophysical research resources, while Shannon was trying to build a centralized NIH computer facility accessible for administrative uses.⁶¹ Due to the paucity of basic computer research generally, Lusted's committee made little progress towards the establishment of satellite computing centers. At the same time, NIH faced an acute shortfall of Minneapolis-Honeywell 800 capability on the main campus.⁶² Shannon intervened to terminate ACCR in July 1963 and to reconstitute it as the Computer Research Study Section, thereby restoring leadership in a critical new field to the Office of the Director and reintegrating the activity with intramural computing. The result was an additional discouragement of programming activity. According to Dr. Murray Goldstein, then Extramural Program Director, National Institute of Neurological Diseases and Blindness, executive secretaries coordinated less with program staff, and study section members were told to focus primarily on review.⁶³ Study sections continued to stimulate research by means of symposia, conferences, and publications, but the era of independent programming was fast closing.

3.3

The Administration of Dr. Eugene A. Confrey: Program Change, Mainframe Technology, and the Search for Extramural Direction, 1963-1968

The initial cycle of administrative strengthening that followed the Fountain Committee hearings brought the Division into a period of relative stability. DRG staff grew from 432 in June 1961 to 514 by June 1964, and then leveled off, registering 532 at the end of FY 1968.⁶⁴ Workloads grew steadily, but not dramatically. Competing and noncompeting applications received by the Division for research grants, fellowship awards, and training grants totaled 31,909 in FY 1964 and 37,428 in FY 1968, while the dollar amount of grants and awards increased from \$773,151,536 to \$842,987,767 from FY 1964 to FY 1967.⁶⁵

After completing his staff reorganization in June 1964, Dr. Confrey retained the basic five-branch organization for the Division, but he also added a succession of operating offices to accommodate new staff functions. These included the Civil



30. Dr. S. Stephen Schiaffino, Referral Officer, and the staff of the Referral Office, 1965. Courtesy of Dr. Schiaffino.

Rights Liaison Office in 1965 and the Institutional Relations Office in 1967. The Policy and Procedures Office, the Conference Coordinator, and the Patent Office were transferred to the Surgeon General's Office during the 1967 PHS reorganization.⁶⁶ At the 20th anniversary in January 1966, Director Confrey declared that he would "reinforce the traditional strengths" and "respect the scientific excellence in the research the PHS sponsors."⁶⁷

As the Division's grants management and awarding functions diminished, initial review became the main focus of activities. Numbers of review groups peaked in 1966 at 60 study sections and 12 fellowship review committees. Approved initial reviews by DRG review groups in 1966 totalled 6,385, almost double the 3,220 approved reviews recorded for 1960.⁶⁸ The upward trend slackened after January 1, 1967, when five study sections and three fellowship review committees concerned with mental health were transferred to the National Institute of Mental

Health (NIMH), which at that point became a separate PHS bureau.⁶⁹ The Research Grants Review Branch added a Special Programs Section to review applications from programs such as Cancer Chemotherapy, Heart-Cancer-Stroke, and the U.S.-Japan Cooperative Medical Science Program. The number of DRG special review panels increased from 8 to 26 during 1960-1966.⁷⁰

Stimulative activities in the form of study section workshops increased, with most interest shown in environmental or behavioral areas. The DRG Information Office tallied 32 published symposia proceedings between March 1964 and October 1967. Among program activities, special importance was attached to the Endocrinology Study Section's National Pituitary Agency, the Genetics Study Section's published methodology volumes, and Toxicology's national conference on agricultural chemicals.⁷¹ Among the surveys of stimulatory activities generated at this point was a *Science* article by James H. Cassedy, Executive Secretary of the History of Life Sciences Study Section, and later Chief of the Research Grants Review Branch (RGRB). "PHS consultants," he wrote,

have become Twentieth Century equivalents of peripatetic medical men of the Nineteenth Century—who walked around setting up new medical institutions and bringing medical ideas to outlying parts.⁷²

However, modernization pressures were at work in the review process, limiting traditional practices and advancing program alternatives to the project grant system. The Chairman's Grant, the traditional mechanism for funding study section activities, became a focus for conflict after July 1963, when congressional committees ruled out expanding the DRG allotment of the General Research and Services appropriation beyond \$1.2 million, the FY 1963 level. In September, Shannon undertook to replace Chairman's Grants, renamed Scientific Evaluation (SE) Grants, with personal service contracts, payable through the NIH

Management Fund, controlled by the Institutes and the NIH Director's office.⁷³

An innovation born of expediency, the personal service contract mechanism had been employed successfully by DRG to operate CDRB fellowship committees since 1962 and to augment study section accounts when Chairman's Grant funding ran out. A study conducted by the Office of the Associate Director for Extramural Research and Training in December 1963 recommended replacing SE grants with contracts as a means of strengthening centralized program management.⁷⁴ However, DRG and NIH preferred the separation of review groups from program managers, which the grant mechanism traditionally provided. The upshot, a DHEW General Counsel determination that study section members were special Government employees and therefore ineligible to receive grants, did not resolve the issue. The NIH Director's Office would not seek new enabling legislation to establish a statutory basis for personal service contracts, even though a staff evaluation predicted \$95,445 in administrative savings.⁷⁵ This decision also complicated the clearance problem for new consultants, who were required to submit affidavits denying subversive activity. These difficulties made the Chairman's Grant a recurring source of congressional criticism of the misdirection of research funds and the general obsolescence of operational methods in the grants program.

On balance, however, traditional forms held sway. The most telling example was the 1964 decision, made largely outside of the Division, to discontinue making Research Career Awards. A moratorium on new Career (K-6) Awards, announced in May 1964, limited support to awards already granted, based on reductions in the FY 1965 budget. More substantive problems had been discussed in April at a national conference sponsored by awarding units. No consensus developed on award criteria other than scientific excellence, and the original purpose of the awards — salary stabilization for research faculty whom the university could not

support — had been superseded. Blame was placed on the “national, competitive selection process,” which set aside faculty prerogatives and gave the appearance of a “Federal intrusion.”⁷⁶

Dr. Confrey was more explicit about the acceptability of traditional grant forms in September 1967, when he chaired an NIH review of special program awards. Comparing DRG’s “centralized” style of initial review with the “decentralized” style conducted by Institute panels, Confrey found “capricious differences in procedures, terms, and conditions of award” in the latter. He cast the centralized style as a model of efficiency and objectivity. The ideal review process, he proposed, was an “NIH centralized monitoring system, computer-based, and rapidly responsive” to handle program-project-type applications. Criteria could be standardized, and program influence held to a minimum. His larger position — “where there has been pluralism and diffusion of responsibility, problems have occurred” — did not differ substantially from that of his predecessor, Dr. Lindsay.⁷⁷ Both were reacting against the dominant trend of the Shannon era, the impulse to supersede the limits of project grants by establishing new grant venues. The traditional study section approach was not appropriate to “large scale activities more clearly associated with major Institute program efforts,” NIH Associate Director for Extramural Affairs Dr. John Sherman wrote in response to Dr. Confrey’s proposal. What the times demanded, Sherman believed, was a “control review and an evaluation component” directly responsible to management by the program Institutes.⁷⁸

The Division did develop nontraditional grant functions associated with quality assurance, beginning with the monitoring of civil rights compliance by grantee institutions. To implement Title VI of the Civil Rights Act of 1964, the Department required grantees to certify the absence of discriminatory practices as a condition of receiving awards. As the NIH contact point, the Division was able to notify grantees and to create an assurance file on extremely short notice in January 1965. This inaugurated a

grantee service that passed on to OD/NIH in 1969.⁷⁹

A more weighty function, the protection of human research subjects, originated in November 1964. The Department required all grantee institutions to screen clinical applications for hazardous procedures beginning November 1, 1966, and DRG was again designated as contact point. Within 6 months, the Division had accumulated 1,000 assurance statements, and grantees had accepted special preliminary review of clinical proposals.⁸⁰ Although the function of grants policy development had been transferred to the Surgeon General's Office of Extramural Affairs, DRG staff conducted the policy review and prepared the PHS statement on human subject protection, which became effective on July 1, 1967.⁸¹ Dr. Confrey articulated the ethical guidelines for PHS clinical research at a World Health Organization/UNESCO conference in Paris in October 1967. A survey of the DRG study sections in the following year found that the number of summary statements noting experimental conditions hazardous to human subjects had decreased to 0.67 percent from 2.24 percent for the January-February round in 1966.⁸²

The Division's major accomplishment under Dr. Confrey was bringing into fruition the computerized central data function known after 1968 as IMPAC (Information for Management Planning, Analysis, and Coordination of the extramural system). Prior to 1965, efforts by Dr. Shannon's staff to establish direct, centralized management of NIH computer services had lagged behind dynamic developments in computer technology, particularly the introduction of magnetic tape, random-access memory mainframes. At the same time, innovations in automatic data capture expanded operations at the working level had led operational planners such as Peyton Stapp, DRG Assistant Chief for Analysis and Statistics, to attempt to set up self-contained computerized record systems.⁸³ In July 1964, after NIH installed a second Minneapolis-Honeywell 800 dedicated to extramural uses, the Statistics and Analysis Branch (SAB) began entering pending

award data on a single magnetic tape file. By January 1965, the system stored 30-odd records for each pending grant, including summary statements, and was automatically generating Notices of Award and the face page of the noncompeting continuation application kits.⁸⁴ The single file format allowed Institute grants branches immediate access to individual grant records. It also enabled analysts to query current status information from all PHS grant applications — a universe that spanned 75 initial review groups and 23 Institutes or program divisions, then domiciled in three PHS Bureaus. Updated nightly, the file was maintained within DRG by 60 data clerks who made entries on punched cards and fed them into the computer.⁸⁵

Despite enthusiastic support from Dr. Shannon and his Associate Director, Dr. Sherman, the SAB central data system was seriously hindered in its development by organizational disarray outside DRG. In May 1965, when the Division of Computer Research and Technology (DCRT) decided to purchase an IBM 360 to replace one M-H 800, Stapp tried to purchase the outmoded unit for installation in the Westwood Building, on the grounds that DCRT would disrupt data capture in SAB during protracted conversion of operating programs to IBM.⁸⁶ The IBM decision stood, and conversion efforts, aided by 22 IBM programmers, were completed in September 1967, without serious interruption to operating programs, which were significantly expanded during the conversion period.⁸⁷ Stapp continued to press for direct DRG control of one IBM 360 to ensure appropriate software support and handling routines, without which he feared his system could collapse. These features remained out of reach, however, because of the pre-eminent need to integrate statistical data systems with fiscal management systems under the aegis of the Office of the Director, NIH. PHS reorganization efforts after January 1966 posed the real option that DRG might be taken out of NIH and transferred to the Office of the Surgeon General. Shannon's decision in March 1966 to retain all DRG functions

within NIH effectively ensured that an independent data processing system would not be attempted.⁸⁸

Other Division activities were similarly curtailed or redirected in the uncertain institutional climate that prevailed after 1966, as the Public Health Service was drastically reduced in size and the Department of Health, Education, and Welfare assumed the leading role in Federal health and medical research.⁸⁹ The Grants Management Branch, in particular, after losing its 1967 bid to transform the History Card Unit into a third extramural data bank, was quietly closed down in 1969. The last GMB Chief, Donald F. Chalkley, was attached to the Office of the Director, DRG, where he supervised relations with grantee institutions and wrote a new PHS policy for protection of human subjects in research.⁹⁰ In August 1968, Director Confrey announced a major change in the Division's mission. Due to a departmental decision making each major PHS agency responsible for its own extramural operations, the Division would no longer exercise the "single manager" function for the entire Public Health Service. Henceforth, its support services and initial review functions would be largely limited to NIH and occasional special projects.⁹¹

3.4

Shifting Patterns in Peer Review Practice: Dual Review, Priority Scoring, and the Yeager Report, 1961-1968

During the Shannon years, the Institutes grew in influence within the extramural system, while the relationship between program and review functions became more complex and interdependent. For Councils as well as study sections, review activities in 1961 were still primarily focused on scientific merit assessments. The evolution of the dual review system up to that point had concentrated responsibility for scientific review in the study sections, but Councils had not yet acquired program review capa-

bility.⁹² Operational principles for dual review were set by a November 1961 dictum from Surgeon General Luther L. Terry, which stipulated how Council/study section disagreements on the scientific merit of specific applications were to be resolved. In the case of "Special Grants," which included collaborative studies, program-projects, and projects initiated by the Institutes, "direct negotiation by staff to initiate a grant proposal" was allowed, with initial review organized by DRG.⁹³

Program relevance considerations first appeared in 1962 in implementing regulations originated by the Interbureau Directing Committee under Deputy Surgeon General David E. Price. Promulgated by the DRG Policy and Procedure Office (PPO), these PPO circulars authorized Institutes to set up special review panels with DRG observers and to request referral of program-relevant applications to program divisions for review. The purpose of the process was widened to "advice on the scientific and administrative merits," and Institutes were authorized to decide cases in which Council and study section recommendations were in disagreement. Moreover, Councils were directed to "consider policy matters and program interest which should not affect the preliminary review of scientific merit."⁹⁴ The identification of Councils with program relevance and study sections with scientific merit review was in part a response to the Fountain Committee, which had complained that "Institute staffs had tended to become subservient to the Councils" and should play a larger role in the review process. The Interbureau Directing Committee (Price Committee) also established new Council voting procedures requiring individual discussion of applications with annual budgets exceeding \$100,000, or where "the recommendation of the reviewing group is contrary to policy." The Price Committee also mandated "administrative disapproval" of "applications falling into the lowest 10% of the priority range of each study section and reviewing committee."⁹⁵

Although its policy role diminished over the decade, the Division's operating experience helped shape the emerging



31. Presidential visit, NIH Clinical Center, July 21, 1967. From left: Surgeon General William Stewart, President Lyndon B. Johnson, NIH Director James Shannon, Assistant Secretary of Health Phillip Lee, and Clinical Center Director Jack Masur.

consensus view that programming activities effected the objectivity of merit review and had to be kept organizationally separate. The brief but intense season of program-projects in the Special Programs Review Branch during 1960-1962 convinced Branch Chief Gordon H. Seger that his "concurrent attempt to determine both the intrinsic merit and the program merit of applications" was no longer practicable, and the review groups could function better in a program environment.⁹⁶ During 1962-1963, the Advisory Committee on Computers in Research, a DRG study section, became over-involved in programming for field development, to the extent that members openly assisted in the preparation of applications they would later review. Before Shannon intervened in June 1963, Dr. Lindsay arranged to

transfer the function to the newly-formed Division of Research Facilities and Resources (DRFR), where the new executive secretary, Dr. Bruce Waxman, became chief of a program branch in March 1965. Allen, Lindsay, and DRFR Chief Frederick L. Stone agreed upon "the clear separation of program responsibility (including implementation of policy and procedure) from the review of research project grant applications."⁹⁷

As the extramural system crossed the billion-dollar threshold into "big science" in 1966, certitudes nourished by the project system began to give way. At a general meeting of NIH program and review staff on August 23, Chief Confrey was perplexed by the incomprehension that many grantees and consultants voiced over the new institutional review requirements for clinical research: "For a grantee to ask the agency how often surveillance should occur...to ask how to prepare records of informed consent—surely these are somewhat inappropriate questions," he remarked, given the "complementary roles" traditionally played by NIH, investigators, and grantee institutions. "It is inappropriate to start down this path of providing detailed rules and regulations simply because the pathway is endless," he warned.⁹⁸ Confrey's reliance on shared responsibilities derived from an earlier era of direct scientist-to-scientist contact, when Division staff maintained direct personal contact with investigators, reviewers remained familiar with the contents of applications, and investigators took responsibility for the direction of their research.⁹⁹

Other extramural administrators saw the project system as the problem and blamed traditionalism for eroding the institutional strength of NIH and encouraging an unmanageable diversity in program development and review procedures.¹⁰⁰ ADERT Dr. John Sherman held that the NIH Study Committee appointed by President Kennedy and chaired by Dean E. Wooldridge had recommended a strong, centralized NIH administration in which the project system, still respected as the homeground of peer review, would be "balanced" by program

systems managed by the Institutes.¹⁰¹ The case against study section traditionalism was bolstered by President Johnson's public campaign that summer to turn Shannon and the Institute directors away from basic research and toward directed programs, primarily the Cancer, Heart Disease, and Stroke initiatives launched in 1964.¹⁰²

The implications for the review process of this new emphasis on programs rather than projects were sketched out in the Wooldridge Report. Although the NIH Study Committee pointedly praised study section procedures and criticized the largest directed program, Cancer Chemotherapy, for dispensing with outside reviewers, its recommendations for stronger program management pointed towards directed research as the rising trend.¹⁰³ For the Division, the modification of traditional peer review to meet various new program requirements was an operational problem dealt with expediently on the working level. Several administrative experiments were conducted, the most notable of which was the 1960-1962 effort to establish centralized review for program-project grants. But when the Office of the Surgeon General attempted to set up centralized management responsibility for all PHS grants and contracts in 1966, the OSG



32. Dr. Pacita Pronove, Executive Secretary, Neurology Study Section, 1961 – 1962; Neurology A Study Section, 1962 – 1964; Child Health and Human Development Program-Project Committee, 1965; General Medicine B, 1965 – 1972. Female professional appointments became significant during the 1960s. By 1971, 8 of 49 DRG executive secretaries were women.



33. Psychopharmacology Study Section, 1964, shortly after transfer to NIMH. Irving Simos, Executive Secretary, standing second from right. Courtesy of Charlotte Simos.

task force — in which Dr. Confrey served as executive secretary — concluded that “program should be the determinate” in all administrative questions governing initial review. Effectively, the Division at this point backed limited decentralization and supported the movement of some DRG study sections to Institute control as an alternative to extending its administrative services to newly emerging DHHS agencies with grant authority. However, by 1967 the rapid growth of “capricious procedures” in review groups swung thinking toward the opposite pole. Dr. Confrey’s reevaluation of special reviews in that year recommended returning to centralized review and the standardization of Institute panels.¹⁰⁴

More searching inquiries into operational problems suggested that decentralized review and reliance on “an active Institute role” held the key for study section development. On a more technical level, a 1965 study by J. Palmer Saunders and Mordecai H. Gordon of NCI demonstrated that priority scores had always been used to determine order of payment and were not

solely an expression of scientific merit.¹⁰⁵ This finding confirmed the suspicions of John Sherman and others that, as the Council function declined and the study sections grew in importance, the Institutes were allowing many study sections to make funding decisions that by right belonged to the Institute directors.¹⁰⁶ A more comprehensive survey of review practices by Dr. Samuel S. Herman in 1969 detailed the extent of pluralism, particularly in regard to the degrees of separation of program and review. Herman found that Institutes had modified the review procedures by developing initial review panels following decentralization of special review in 1963.¹⁰⁷ A third study compared different methods current in 1968 for paying approved applications and found justification for retaining all within the programs of the National Institute of Allergy and Infectious Diseases (NIAMD). Dr. Shannon summed up the larger problem for the House Commerce Committee in July 1968: "We need to ask ourselves whether the project support system has overreached its point of maximum utility."¹⁰⁸

The variety of review procedures continued to grow after 1967, even as the number of awards stabilized.¹⁰⁹ As the crisis year of 1968 approached with severe budgetary shortfalls projected for the immediate future, Dr. Sherman commissioned Dr. J. Franklin Yeager, retiring NHI Associate Director for Extramural Affairs, to examine priority ratings and to propose new methods of restricting awards.¹¹⁰ Strongly committed to the project grant system, Dr. Yeager proposed that the expected cuts be limited to large projects and program grants so as to minimize the impact on individual investigators. He recommended against proportional cuts based on priority ratings because several variants were in use and the degree of study section bias could not be reliably determined.¹¹¹

The most useful portion of Yeager's report was the attached compilation of 23 reference documents representing peer review innovations from within and without DRG since 1960.¹¹² The compilation reflected how the Division's consensus on peer review

practice became unsettled during the 1960s and the growing need by 1968 to develop a new managerial focus for peer review. Yeager's term of reference, "tripartite review," acknowledged the rise of Institute program branches to equivalent influence with study sections and Councils in the review system. Negotiation of grant budgets by program staff had become an essential feature of the award process, which he characterized as a "triple review-evaluation-payment system." Expansion had brought complexity, but Yeager remained confident that operational problems were still solvable. Program staff could now provide a critical balancing function, he believed, by negotiating awards downward and stabilizing the entire system in the coming years.¹¹³

Discontent with the review process focused on DRG priority scores and the lack of "definitive indicators of the degree of scientific merit, degree of program relevance, appropriate order of payment."¹¹⁴ A 1963 study, however, traced reviewer confusion to the variety of review techniques used by different study sections in conducting discussions and writing summary statements. The suggested antidote in 1968 for "impressionistic" evaluation was to reconstitute the numerical scale to cover the 39 percent of applications being disapproved, thereby more closely approximating the "scientific ideal" used as a referent.¹¹⁵ Other review staff experimented with 3-point and 10-point scales and separate tabulations for scientific merit and ranking order. There was fear that Congress would impose rules on the review process and also the fear that even "interim procedures" would alter the underlying relationship of NIH with the scientific community.¹¹⁶

None of the proposed changes satisfied either DRG staff or Institute program management, and the process of unsettlement continued. Increasingly, the impetus for modernization was passing to the Institutes, which by 1966 were reviewing 21.7 percent of the dollar value of applications. The institutional grant mechanisms that the Division had labored since 1948 to bring into being were by this point outside its operational reach. The

same process of evolution, which by 1968 had brought the number of grant and fellowship review groups to 71 and the complement of DRG reviewers to 754, had also reduced discussion time at meetings to approximately 10 minutes per application. The view was gaining in Congress that "the study sections are overtaxed to the point that an effective evaluation of grant applications cannot be reasonably expected." The NIH rebuttal placed its faith in the expansion of review mechanisms outside DRG.¹¹⁷ Dr. Yeager closed his study with a tribute to the system's founders — Ernest Allen, Rolla Dyer, and C.J. Van Slyke — and recorded his regret that "the current multiplicity of rules, regulations, and procedures" had "beclouded" what had once been a clear vision.¹¹⁸

“Paths to Quality”: Reinventing Peer Review in an Era of Budgetary Retrenchment, Political Conflict, and Scientific Growth, 1968–1976

Research has been magnificently contributory. . . . But in the ebb and flow of public favor, it is going out of style at this time. . . . Unless positive action is taken soon by the Government to assure the scientific community of the sincerity and depth of the Federal commitment, the whole enterprise could collapse badly. Research is truly at the crossroads.

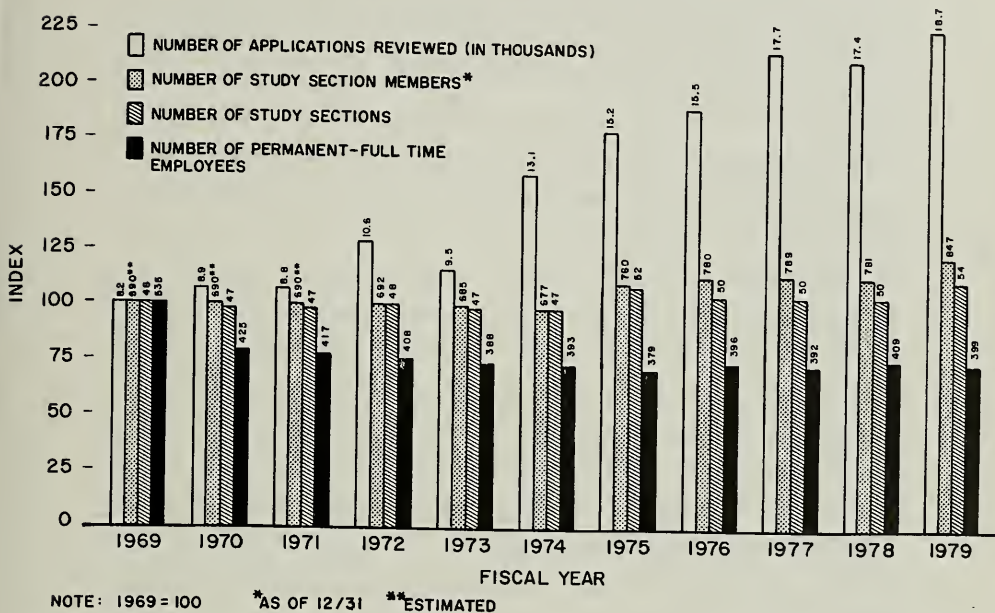
Dr. Robert Q. Marston, NIH Director,
briefing materials for HEW Secretary
Elliot L. Richardson, June 26, 1970

When Dr. James Shannon retired as NIH Director in September 1968, the Federal biomedical establishment had generated a crisis of confidence that would last through the midpoint of the following decade.¹ Shannon’s successor was Dr. Robert Q. Marston, Director of the NIH Division of Regional Medical Programs and leading proponent of the Johnson Administration effort to disseminate clinical advances in heart disease, cancer, and stroke throughout the Nation’s medical care system. Drastically scaled back and severed from NIH in 1968, the program’s rapid demise served as prelude to the protracted reexamination of health policy objectives and the NIH mission during the Nixon Presidency.² To Marston the crisis was rooted in “the disparity between expectations created and performance delivered”³ in the heady expansion of the previous decade.

During 1962-1967, Federal investment in biomedical research institutions through grant programs funding basic research, facilities construction, manpower training, and research center operations had brought into being what Shannon called the "science base," a nationwide network of laboratories, investigators, training facilities, and clinical centers, which was to serve as the institutional platform for the next generation of research advances.⁴ Beginning in 1967, as funding leveled off and regional development programs faltered, this emerging science base suddenly became vulnerable to budget cuts and dismemberment. A succession of budgetary body blows — first, Lyndon Johnson's Vietnam-driven budget cuts in 1967 and 1968, and then Richard Nixon's 10 percent staff reduction, his FY 1970 budget veto, and phase-out program for training grants — convinced Marston's staff that the Federal Government sought to "terminate the growth and to initiate the shrinkage of the national program of biomedical research." For successful consolidation of the science base, the biomedical research enterprise required 16 percent annual budget increases. The Nation's medical schools were dependent on indefinite Federal commitments covering 50 percent of faculty salaries. Yet the Nixon Administration, despite high-profile support for a new "war on cancer," remained committed to zero budgetary growth and a return to private support for medical schools.⁵

Although Director Marston gamely portrayed the NIH staff in 1970 as a "happy ship," the view from DRG was less sanguine. In January 1971, the employee newsletter noted that Division staff had dropped from 610 to 406 since 1966. Shifting Federal priorities placed health manpower training for service above basic research, the newsletter warned. Faced with severe staff and budget limits, the best survival strategy for DRG was "to roll with the administrative punches."⁶ For the Division leadership, the post-Shannon period entailed the most trying passages, the most difficult travails in its institutional memory. After application volume resumed its upward trend in the spring of 1971, further

DIVISION OF RESEARCH GRANTS **GROWTH RATES OF APPLICATIONS REVIEWED, STUDY SECTION** **MEMBERSHIP, NUMBER OF STUDY SECTIONS, AND TOTAL** **NUMBER OF PERMANENT-FULL TIME EMPLOYEES** **FY 1969-1979 DRG STUDY SECTIONS**



34. Staffing and Workload Trends for DRG Study Sections, 1969 - 1980.
 Briefing book for Director's annual review, 1980.

attrition brought the staff level to 377 in 1975 while the number of study sections was held at a ceiling of 50. A workload crisis ensued, as the volume of competing applications rose from 7,920 to 11,369 in 1976. Faced with study section workloads averaging 355 per year, prospective reviewers began to decline appointment. The resignation rate for members increased from near zero to 2.6 percent in 1975.⁷ Other effects of restricted resources were constant levels for Chairman's Grants, elimination of the employee newsletter, and support for only five study section workshops in FY 1974 and eight in FY 1975.⁸

However ubiquitous, budgetary retrenchment was but one of many evils besetting NIH in the post-Shannon years. Determined to downsize Federal biomedical operations, the Nixon Administration also waged war against the burgeoning DHEW grant system. After suspending training grants, reducing the number of review committees, and impounding appropriated funds, the Administration attempted to abolish or radically alter peer review itself. Although effectively ending in a draw with President Nixon's resignation in August 1974, this political conflict discouraged the NIH leadership, retarded scientific development, and strained relations between the scientific community and NIH.⁹

Apart from the political conflict with the Nixon Administration, a more fundamental process of scientific growth and administrative modernization was at work. Beginning with the National Cancer Act of 1971, Congress enacted a series of mandated programs for specific diseases and behavioral problems, and these indirectly expanded basic research opportunities in fields such as cell biology, immunology, and virology. As predicted by the Wooldridge Committee report and subsequent surveys, the new extramural growth after 1971 favored nontraditional grant mechanisms — program-projects, training grants, center grants, and collaborative and directed programs. Program development became the primary tool for extramural management, and program advisory procedures giving greater weight to program relevance took root among the growing number of NIH initial review groups operating outside DRG.¹⁰ By 1975, traditional research projects accounted for 39.3 percent of all NIH awards, down from 43.1 percent in 1968, while program-projects, center grants, and research and development (R&D) contracts held a 47.1 percent share. The necessity for innovation and institutional change within the peer review system was widely acknowledged. The challenge, as Marston saw it, was to shift the policy focus from growth to quality, and to pursue excellence in research and peer review in as many ways as possible.¹¹ The larger saga of the

post-Shannon years, then, is the working out of this internal dynamic of change and self-renewal.

4.1

“Research at the Crossroads”: Administrative Reorganization, the Belmont House Conference, and the Challenge of Collaborative Research, 1968 – 1972

The Shannon transition was complicated by a series of putative reorganizations within the Department of Health, Education, and Welfare, which permanently weakened DHEW and contributed to the isolation of NIH during the Nixon era. The ensuing administrative turmoil frustrated efforts to integrate project grants and institutional grants within a single, comprehensive administrative framework and destabilized the institutional environment of peer review.

Reorganization efforts had begun in April 1966, when Secretary John Gardner transferred the Surgeon General’s statutory authority to his own office. Gardner and his successor, Wilbur J. Cohen, viewed the PHS as an obstacle to effective control of the vastly expanded Federal health system created by



35. NIH Director James A. Shannon and staff, March 1968. From left: Shannon, G. Burroughs Mider, Richard L. Seggel, Joseph S. Murtaugh, Eugene A. Confrey, Stuart M. Sessoms, John F. Sherman, Jack Masur, and Robert Q. Marston. Courtesy of Dr. Confrey.

President Johnson's Great Society programs.¹² In April 1968, Secretary Cohen placed the Public Health Service under the authority of Dr. Phillip R. Lee, Assistant Secretary for Health and Scientific Affairs. While the old PHS bureau structure was headed largely by Commissioned Corps officers, the new organization was predominantly civilian. NIH was reconstituted as a DHEW operating agency, comprising research institutes and divisions, the old PHS Bureau of Health Manpower, and the National Library of Medicine. Along with broader health responsibilities went a change of mission. "Within the new NIH," the Department ruled, "educational activities will have an equal status with the agency's research activities."¹³ Never fully consolidated, the NIH changes lasted only until 1973, when the manpower function was detached. Kept understaffed by personnel ceilings and program cuts, the Department's organization did not stabilize until 1975, after three more Assistant Secretaries and two more Secretaries had come and gone.¹⁴

The PHS reorganization of 1968 drew the Division into a bureaucratic power struggle between the emergent DHEW leadership and the more seasoned NIH organization, which Dr. Shannon had set on a highly independent course prior to retiring. Since 1966, DHEW had sought to detach DRG from NIH and to relocate its statistical and review functions in the Office of the Surgeon General as part of a strengthened departmental oversight of extramural activities. An informal agreement was reached during early May 1968, between the NIH Office of Policy Planning and Evaluation (OPPE) and Ernest Allen, Director of the DHEW Office of Extramural Programs (OEP). Grant administration responsibilities fell mainly to NIH, while OEP/DHEW was to coordinate policies and procedures developed in the three operating DHEW agencies.¹⁵

Congressman Fountain intervened on May 17, demanding that Secretary Cohen establish "a single grants management office" in PHS as well as an oversight division and a "central Division of Research Grants" for all department agencies. The

same day DHEW empowered Allen to oversee NIH grants policy, issue a unified grants manual, and adjudicate problems involving NIH grants.¹⁶ Shannon declined to accept the DHEW directive, claiming these functions for his own agency. In July, his planners decided to attach DRG review, statistics, and management functions to the Office of the Director, thereby changing the Division's functional status from line to staff and imposing direct ADERT supervision over DRG operations.¹⁷ These changes, which relieved the Division of its administrative role, were a prelude to proposals for its abolition as an operating organization. Shannon appeared to have accepted the recommendations for ADERT supervision in principle, but he did not sign off on the final reorganization proposal, which was developed 6 weeks after his retirement on September 1.

Since October 1967, the Division had been playing a difficult transition role in the PHS reorganization. Its assigned PHS mandate was receipt and referral to NIH and other PHS bureaus of applications for research projects, the career award program, the joint construction program, and fellowships through February 1, 1969, after which responsibility was to pass to the newly organized DHEW administration.¹⁸ In April 1968, Dr. Shannon assigned DRG the additional transition task of coordinating and issuing a new PHS grants manual, in preparation since 1964. In August, Dr. Eugene Confrey, DRG Chief, announced that, effective with the Fall Council meetings, the Division was terminating the "single manager" role in PHS receipt and referral which it had provided since 1959.¹⁹ The deadline was extended for DHEW agencies, which had not developed the staff or procedural basis for decentralized grant administration. However, Dr. Confrey's staff had no hint that the Director's Office was contemplating the breakup of DRG until mid-October, when a DHEW/NIH draft grants manual was received, which superseded the DRG submission and effectively relieved the Division of its role in extramural policy.²⁰

After assuming office on September 1, 1968, Director Marston signed off on the OPPE reorganization plan and scheduled a high-level review conference at the Belmont House for November 15-17. The semi-finished document, which was to be presented there to 30 selected senior NIH staff, proposed "to abolish the Division of Research Grants" and transfer its functions and personnel to the Office of the Director, NIH. Scientific review, program analysis, institutional relations, and policy issuance would become responsibilities of the Office of the Associate Director for Extramural Research and Training (ADERT), while data analysis and processing would pass to the Associate Director for Management.²¹ The NIH plan was intended to check a DHEW directive circulated November 7, which extended the Division's single-manager services into 1969, preserving its independence and asserting control over NIH/OD extramural management.²²

Although the Institute directors informally agreed to transfer the Division's functions to the Office of the Director, Dr. Confrey adamantly denounced the move as a breach of trust with the grantee community and the Division's workforce.²³ At the Belmont House, Dr. Confrey argued strenuously that only the Division's "meticulous attention to the quality of performance" assured efficient management of the central extramural resource. "Excellence implies a center," he warned, and dispersal could only degrade the quality of DRG services. In the ongoing turmoil of health service expansion and reorganization, he argued, quality of review required maintaining an institutional locus for working staff and a shared commitment of service with consultants and the larger scientific community.²⁴

Confrey's emotional appeal turned the argument. The conferees accepted reorganization in principle, but rejected Marston's proposed abolition of the Division.²⁵ On November 25, Marston's staff submitted an amended plan. The Division was retained as an administrative entity and made a part of the Office of Director, NIH. Data analysis and processing were left within

DRG, and OD/NIH efforts to control Institute programming and review activities were curtailed. DRG grants management functions were transferred to the Financial Management Branch and supervised by the NIH Associate Director for Administration.²⁶ The change that stuck until August 1974 was elimination of line status. As a staff organization, DRG operations for the next 5 years would be subject to direct ADERT supervision, and extramural policy functions became the province of the Office of the Director, NIH. DHEW affirmed a continuing role for the Division as a “central resource” for referral and receipt functions, as needed, in new DHEW agencies that lacked the staff or resources to develop grant processing capability.²⁷

In denouement, this climactic NIH/DHEW contest for the future of extramural research brought incremental advantages to both claimants, but it also compounded the difficulties of administering the burgeoning system of new public health services. The term, “disjointed incrementalism,”²⁸ used at the time to describe the irregular pattern of fiscal growth in biomedical support, applied as aptly to this internal political conflict. Increasing internal resistance to administrative change was evident in January 1969, when Assistant Secretary Lee began setting up the DHEW-wide committee management function demanded by Congressman Fountain. OPPE coordinated efforts by other DHEW operating agencies to frustrate establishment of a centralized committee management administration.²⁹ Thereafter, NIH began developing its own committee management function, but the belief in Congress grew that the proliferation of advisory committees had become unmanageable. Likewise the effort to deny DRG and the Division of Research Services (DRS) the “full range of delegations the IRDs (Institutes) are given” resulted in confused lines of authority, inhibited communications, and reduced operational efficiency. Direct reporting by the DRG and DRS directors to the Director, NIH was restored in August 1974.³⁰

A similar charge — that NIH had grown “too large, cumber-

some, and vulnerable ... too bound to traditions and hampered by procedures”³¹ — emerged from within the peer review system in the spring of 1969. The immediate controversy involved the experimental drug L-dopa and the perception among the Institute directors that a dramatic research breakthrough promising curative therapies for Parkinsonism had been mishandled in the review process. In September 1968, staff at the National Institutes for Neurological Diseases and Stroke (NINDS) programmed a 3-year, \$3.6-million collaborative project involving clinical trials designed to meet FDA requirements for L-dopa, along with laboratory work to test additional drugs. The Senate Appropriations Committee earmarked \$1 million for the study, but the hastily drawn application was recommended for disapproval by a DRG special review group, which objected to major inadequacies in the clinical protocol.³²

When the NINDS Council concurred with the study section review and the project was scrapped, the lead in L-dopa development was taken by two private firms, Hoffman-LaRoche and Norwich Pharmaceutical, which began field testing a synthetic product in the spring of 1969. Criticized by Congress for failing to deliver a possible curative in the public sector, the Institute protested the review and won support from Dr. Marston and the intramural community. Disregarding the Division’s argument that the application was seriously flawed, Marston agreed with the Institute directors that “review procedures may be overprotective” of study section independence. Marston’s Policy Advisory Committee added that “some means must be found for preventing a study section from thwarting an important activity of an Institute.” Outgoing NCI Director Kenneth Endicott had a more radical proposal — “decentralize the preliminary review apparatus to the Institutes.” One indirect effect was the reassertion of Institute authority in the programming area. In June 1969, ADERT Ronald Lamont-Havers halted distribution of the *Orientation Handbook for New Study Section Members*, in part

because the DRG authors claimed the traditional study section prerogative “to determine areas in which research activities should be initiated or expanded.” Henceforth, such determinations would lie “entirely within the prerogatives of the Institutes.”³³

Apart from program-projects, the preferred modality for Institute program staffs in 1969 was collaborative research, which then occupied a tenuous but increasingly important middle ground between the two basic classifications of NIH research — investigator-initiated projects and centrally managed, targeted programs. The former comprised broad-ranging basic or applied/clinical projects, utilizing mostly the grant mechanism, and were reviewed by study sections and National Advisory Councils. The latter were largely developmental or applied projects, utilizing the contract mechanism, and were reviewed by Institute panels without Council involvement.³⁴ Targeted programs, which originated with NCI’s chemotherapy screening program in the mid-1950s, grew rapidly as research fields matured, rising from 11 percent of NIH extramural awards in FY 1967 to 21.7 percent in FY 1973. Investigator-initiated programs plateaued after 1967, dropping from 57.4 percent to 51.5 percent of NIH awards in that period.³⁵

In this context, the “L-dopa debacle” marked a turning point in the development of the NIH extramural system. Spurred on by massive spending on targeted cancer programs, collaborative research became the leading force in NIH appropriations politics in the decade following 1969.³⁶ Pressed by Congress, the White House, and public interest lobbies to deliver applied research results and disease cures, the Institutes increasingly turned to large, multidisciplinary programs that focused on specific health programs, utilized a mix of grant and contract mechanisms, and combined extramural and intramural resources.³⁷ For the 3-year period beginning in FY 1972, the only extramural growth sectors were research and development contracts, center grants, and program-project grants. Three Institutes specializing in these

program mechanisms — Cancer, Heart and Lung, and Child Health and Human Development — increased their extramural awards by 20 percent, while the seven that relied mainly on regular research grants experienced a 10 percent decline.³⁸ DRG came under increasing pressure to streamline review procedures, to coordinate more closely with Institute program staff, and to adapt the grant mechanism itself to the changing requirements of the community. The Institutes appointed Collaborative Program Directors who first met in August 1969. With the appointment of Dr. Leon Jacobs as NIH Associate Director for Collaborative Programs in July 1972, the new extramural sector had an institutional locus, which competed directly with the Executive Committee for Extramural Affairs.³⁹

Attempts by the Nixon Administration to reform the review system during 1969-1971 only aggravated existing problems, which were rooted in the diminishing role of the Advisory



36. President-elect Richard M. Nixon is introduced to incoming NIH Director Robert Q. Marston. Between them, from left, are Assistant Secretary for Health Phillip Lee, Surgeon General William Stewart, and HEW Secretary-designate Robert Finch. Courtesy of the National Library of Medicine.

Councils in project grant awards. It was no longer practical for Councils to review each favorably recommended application for program relevance, and indeed 90 percent of applications reviewed by study sections received en bloc or group concurrence. This percentage increased after April 8, 1969, when an ADERT memorandum ended the requirement for detailed review of the lowest 10 percent of approved applications.⁴⁰ The National Advisory Health Council, formerly pivotal, briefly ceased meeting in 1968, and OPPE drew up draft legislative amendments to the PHS Act relieving the Health Council of its grant review functions. These were quietly dropped in early 1969 to avoid giving Congressman Fountain an opportunity to restructure the committee system. The Administration also attempted to control Council nominations by inserting its own candidates and reimposing loyalty restrictions. The result was a thoroughly mired appointment process.⁴¹

The cutting edge of Administration efforts to reform peer review, the Federal Assistance Streamlining Task Force (FAST), was charged with eliminating moribund review groups, identifying redundant files for disposal, cancelling superfluous site visits, and rescinding outmoded procedures. FAST inspectors looked upon dual review as an expensive anachronism inhibiting administrative efficiency. In 1970, they inaugurated a campaign to shrink the 210 DHEW grant programs outside NIH by shutting down 26 review committees.⁴² Within NIH grant venues, FAST was more circumspect, recommending more centralized control by the Office of the Director, NIH and shifting postaward responsibilities to Institute program divisions. A FAST team detailed from NIH/OD conducted a work process evaluation of DRG in May 1971, which focused on replacing manual housekeeping functions with centralized paper-flow management.⁴³ While criticizing outdated filing procedures, such as maintaining 30 copies of summary statements, the team also acknowledged that “perhaps no group in the Federal Government is of better caliber or works harder in responding to deadlines through complex operations.”⁴⁴

The streamlining concept and the many FAST recommendations were not unwelcome to extramural administrators inclined to favor the program approach. In September 1970, the ECEA accepted a FAST proposal for single review of fellowships by the Institutes. Dr. Hatchett looked "ahead to a time when the recent proposal to eliminate National Advisory Council review for certain types of applications may come into being." To assist Institute efforts to "provide review of new programs" and to coordinate these with DRG initial review, Hatchett, in February 1972, obtained authorization for the position of Assistant Director for Scientific Review, DRG. Dr. S. Stephen Schiaffino, the first incumbent, was to "represent the OD/NIH" in these explorations outside the familiar territory of dual review.⁴⁵

4.2

The Division Modernizes: Computerization, Affirmative Action, and Quality Assurance, 1969-1976

In June 1969, Dr. Confrey left DRG to become Associate Director of the Bureau of Health Professions, Education, and Manpower Training, NIH. He was succeeded by his deputy, Dr. Stephen P. Hatchett, a former American University biology professor, who had been Chief of the Career Review Development Branch (CRDB) from 1958 to 1964. Under the administrative reorganization developed at the Belmont House conference, Hatchett continued to report to the Director of NIH but worked under the operational supervision of the new ADERT, Dr. Ronald W. Lamont-Havers. No longer considered a free standing division, DRG was now considered part of the Office of the Director, NIH.⁴⁶

Five months later, the Division abolished the Grants History Card Unit, which formerly held grant audit files. By surplusing the Unit's distinctive motorized secretarial desks and retiring the



37. Dr. Stephen B. Hatchett, Director, Division of Research Grants, 1969 – 1976.

collection of over 100,000 file cards,⁴⁷ DRG began leaving the era of machine-assisted manual data processing. During 1970, the Statistics and Analysis Branch (SAB) converted its data processing systems to an IBM 360/65 mainframe, and a 360/20 was installed in the Westwood Building as a remote terminal. Data capture technology progressed rapidly from index cards and paper tape to computer-generated microfilm and optical-scanning typewriters.⁴⁸ There was a steady expansion in IMPAC, the central data system for extramural awards, which had been created in 1968 by inter-linking SAB pre-award data with administrative files maintained by the Office of Administrative Management, Financial Management Branch. In 1970, IMPAC began tracking payback information for fellowships and trainees, and in 1971 the system added research contracts to its information coverage.⁴⁹ Concurrently, the OD/NIH redrew the lines of authority, so that SAB and the Office for Research Analysis and Evaluation became directly responsible to the DRG Associate Director for Research Analysis and Evaluation, who in turn reported to ADERT. The

effect was to merge the functions of data capture and scientific analysis under the immediate supervision of OD/NIH.⁵⁰

Rapid adoption of computerized data processing technology enabled the Statistics and Analysis Branch to introduce numerous client-service innovations and to earn recognition for reliability on both the “wholesale” and “retail” levels. In 1972, the Branch began operating CRISP (Computer Retrieval of Information on Scientific Projects), an independent retrieval system on disk storage for immediate searching of the database of funded research by project, program, or scientific subject. CRISP and IMPAC magnetic tapes were provided to the Institutes, and they were also used for computer printing of the Research Grants Index beginning in 1974. New IMPAC files were opened to track Advisory Committee appointments for the Committee Management Office and training grant records for the Manpower Report Office. SAB Chief Solomon Eskenazi developed his yearly statistical presentations into an annual survey, *NIH Extramural Trends*, and its public-use summary, *Basic Data Relating to the NIH*. Both were used by the NIH Director’s Office as authoritative descriptions of extramural performance. In 1975, an IMPAC Evaluation Group was formed to explore with the Collaborative Program Directors the requirements of a comprehensive data capture system for grants and contracts combined, but the effort foundered the following year when the program managers declined to accord the Division central receipt and referral responsibility for contract proposals.⁵¹

Under Dr. Hatchett’s leadership, the Division downsized and developed a new inner focus designed to stimulate employee participation, redress racial imbalance, and develop staff training. The larger goal, which emerged from the 1970 Airlie House conference on equal employment opportunity, was “to work toward knowledgeable, humanistic, and sophisticated supervision throughout DRG.” The conference probed morale problems and complaints of blocked advancement and low status, as well as the

dearth of African-American scientist-administrators. The conference resulted in comprehensive training opportunities at all levels, intensified internal communications, and a commitment to minority hiring and advancement.⁵² To develop its administrative staff resource and also “provide the mechanics of upward mobility for low-grade employees,” the Division in 1972 brought personnel, mail, budget, and other service activities together in an Administrative Branch. Training and advancement activities associated with the Equal Employment Opportunity (EEO) program became a regular administrative focus.⁵³

By 1973, the Division was supporting 24 staff at the Upward Mobility College, and 336 staff had completed NIH course units preparatory to advancement. Intensified minority hiring remained a leading interest, and to this end a Division survey identified 144 African-American scientists for study section service. However, only three appointments were secured from this interest class by 1976.⁵⁴ Richer opportunities beckoned with women nominees, after NIH and DHEW directives broadened the focus of affirmative action in 1972. The Division elected 20 percent female membership on study sections as the goal for 1972, and by 1973 there were 60 women members (9 percent) compared to 12 (2 percent) in 1969. These results, viewed by NIH Deputy Director John Sherman as “extraordinary,” were used as the basis of the 1973 determination to seek one-third representation of women in all NIH public advisory groups.⁵⁵

The Division had been a latecomer to Civil Rights reform — the appointment of the first African-American study section member, Dr. Frank B. Johnson, was not made until 1966, and the first African-American senior administrator, Deputy Director Dr. George Brooks, was appointed in April 1969.⁵⁶ Since 1965, DRG had monitored grantee compliance with the Civil Rights Act through the Civil Rights Liaison Office, and Director Confrey had expanded this function by taking the lead in developing PHS policy on a parallel issue — protection of human research



38. Dr. Frank B. Johnson, Pathology Study Section, 1966 – 1970.
A U.S. Army pathologist, Dr. Johnson was the first African-American appointed
to a DRG study section. Courtesy of Dr. Johnson.

subjects.⁵⁷ In September 1970, the Institutional Relations Section was set up within the Office of the Director, DRG. Its chief, Donald T. Chalkley, was given responsibility for assuring compliance with these two policies and for rewriting DHEW policy, under supervision of the Assistant Secretary for Health and Scientific Affairs.⁵⁸ Raised to branch status in 1972, Institutional Relations also performed a high-profile information service by providing liaison links with major DHEW grantees and contractors and by publishing the *NIH/DRG Newsletter* for all DHEW grantees. Responsibility for administering compliance with DHEW animal welfare policy was added in 1973,⁵⁹ but human subject protection remained the priority issue. Following disclosure of PHS negligence in the Tuskegee syphilis study, IR/DRG helped staff the advisory panel that halted the experiment and found DHEW liable for care and treatment of disabled subjects. Dr. Chalkley was instrumental in drafting new DHEW guidelines published in May 1974, after which the Branch was transferred to OD/NIH and became the NIH Office of Protection From Research Risks.⁶⁰

To modernize review services, the Division's largest and most sensitive activity in the post-Shannon era, DRG staff had to overcome organizational problems originating on the political level. Nixon Administration efforts to terminate the training grant program by impounding appropriated funds played havoc with DRG's Career Development Review Branch (CDRB), which in 1969 carried 82 authorized staff and 14 of the Division's 62 study sections. Following the peak year of 1969, training and fellowship awards dropped from \$168.1 million, or 17.8 percent of all NIH awards, to \$115.3 million and 9.39 percent in 1973. Certain that OMB would make good its threat to zero out the training grant budget in 3 years, OD/NIH abolished CDRB in April 1973 and redistributed its personnel to the Institutes and to DRG review and administrative services.⁶¹ But after a Federal judge ordered impounded training grant funds released in early December 1973, the Administration suddenly revived the program. Incoming fellowship and grant applications ballooned from about 4,500 to about 8,500 during FY 1974, with the added workload falling entirely on the Scientific Review Branch study sections.⁶² Congress made the arrangement permanent that year by passing the National Research Service Award Act. The \$207 million authorized in individual and institutional awards for FY 1975 carried payback obligations, which the Division was directed to manage as a centralized service, but without any increase in personnel ceilings or operating funds.⁶³

This pattern of sudden swings in program authorization and application volume continued through 1975. The only constants were the slow growth in DRG authorized strength (395 to 407 during 1974-1976), the continued unwillingness of OD/NIH to support Review Branch expansion, and mounting difficulties with Scientific Evaluation Grants, the mechanism for funding study section activities.⁶⁴ Thrown back on its own resources, the Division continued efforts to strengthen the peer review process initiated following the NIH general reorganization in 1968. Committees of

executive secretaries had been organized to evaluate the 1971 normalization of priority scores and to recommend improvements in the review process in 1972 and 1973. A recapitulation of the efforts by the Executive Secretaries Review Activities Committee (ESRAC) in 1975-76 provided technical input for Grants Peer Review Study in 1977.⁶⁵ With the reorganization of the Scientific Review Branch in 1976, the Division began building an internal support system for the study sections. Administrative sections responsible for management, nomination review, and special review assignment were set up, and the 52 study sections were organized into review sections (Biomedical Sciences, Clinical Sciences, Social and Behavioral Sciences, and Special Review).⁶⁶

One limitation that the Division had to accept was the inadequacy of its headquarters building on Westbard Avenue in West Bethesda. Moving out of Building 31 had been a "bombshell," Dr. Confrey recalled,⁶⁷ and many of the Division's staff had never gotten used to the overcrowded conditions, poor engineering services, and isolation from the main campus. In November 1971, a group of DRG employees asked Maryland Congressman Gilbert Gude to investigate the terms of the Westwood Building lease,



39. An ESRAC workshop on summary statements, March 1976.
Courtesy of Dr. Mischa E. Friedman.

which was held by the General Services Administration.⁶⁸ A June 1973 complaint by the Federal Professional Association cited malfunctioning elevators, lack of fire escapes, poor ventilation, and a dangerous pedestrian crossing area.⁶⁹ Improvements were unreliable and slow in coming. GSA stopped payments during the summer of 1975 to ensure that deficiencies were corrected, but a satisfactory solution was not at hand. As the Division began to expand in 1976 to meet the requirements of its doubled workload, its space allotment inside the Westwood Building was actually reduced by 5,000 square feet.⁷⁰ To the staff, the building was emblematic of the physical and political limits of the modernization process.

4.3

Reinvigorating Peer Review: The Cooper Committee, The Grants Peer Review Study, and the Separation of Program and Review, 1969 – 1976

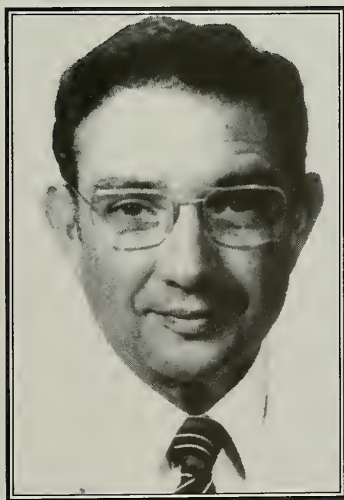
The foreshortened second term of President Richard M. Nixon was a time of systemic crisis for NIH and the extramural system. However, in sharp contrast to the era of Ernest Allen and Cassius Van Slyke, the Division played only a minor role in the arena of policy. Yet the monumental events of 1973 and 1974 served as a crucible for the extramural leadership that took charge after Shannon's departure, particularly for the style of program management by which they attempted to consolidate the institutional gains of the previous era. That the system did not coalesce around the new managerial paradigm — program planning — as expected by Robert Marston, John Sherman, and the new Deputy Director for Science, Robert Berliner, was less attributable to any intrinsic deficiency than to the drastic circumstances of the time and the enduring pluralism of the institution they served. For the Division's leadership, it was largely a question of watching and waiting for this testing of the extramural system to yield new directions for the next growth cycle.

The search for a new extramural focus began in earnest in the summer of 1971, after the Nixon Administration took control of training grant funding away from the Institutes and secured passage of the Conquest of Cancer bill. The former presaged the temporary cessation of Federal training grant assistance to medical schools and academic medicine, while the latter reduced program authority and nearly resulted in a separate agency for cancer research.⁷¹ A special survey done by the Statistics and Analysis Branch, DRG, revealed that only 2,420 grants had been funded out of 4,938 approved by study sections in FY 1970 and that money available for new grants had reached a "catastrophic low" equivalent to FY 1964 levels.⁷² As the focus of planning shifted to targeted research, which seemed to OPPE to offer the most operating efficiencies and the best opportunities for program success, DHEW's Management Planning Group announced that "the original role of the Councils in the grant review process has largely atrophied." The Councils had to be either abolished, converted to advisory status, or re-instituted as major participants in grant review, the report concluded, and none of these options could be considered apart from a comprehensive review of the research enterprise.⁷³

By November 1972, Marston had come to believe that any appropriation increases would be mandated to contracts and that control of new directed research would pass to Executive Branch agencies, primarily the Office of Management and Budget (OMB).⁷⁴ The Senate Appropriations Subcommittee served notice that the Institutes now needed "health research strategies" covering each laboratory and clinic, a comprehensive program structure that appeared to favor contracts over grants. In December 1972, assemblies of study section chairmen voiced wide-ranging fears that contract research was debasing the project grant system by syphoning off funding, by shutting individual investigators out of important new research fields, and by eliminating the need for outside peer review over directed research.⁷⁵ To

restore the confidence of the grantee community and to develop standardized procedures for the collaborative programs, Marston then convened a high-level committee chaired by Dr. Theodore Cooper, Director of the National Heart, Lung, and Blood Institute. Marston charged the Committee to “examine critically the processes by which programs are selected and implemented,” with special emphasis on “coordination of large-scale, multidisciplinary activities” involving both grant and contract mechanisms.⁷⁶ “Investigator-originated projects constitute the keystone of the NIH research system,” explained Dr. John Sherman, Marston’s Deputy Director. However, “program executives must have at their disposal additional funding mechanisms to be able to satisfy national needs.” New administrative procedures governing these additional mechanisms would be developed, it was strongly implied, from within as well as without the project grant system.⁷⁷

By limiting its considerations to operating principles, the 10-member Committee produced a brief, 28-page overview on February 14, 1973. Several weeks earlier, Director Marston had been summarily fired by the Nixon Administration for refusing to



40. Dr. Theodore Cooper, NHLBI Director, 1968 – 1974, and Assistant Secretary for Health, 1974 – 1977. Courtesy of the National Library of Medicine.

cooperate with OMB in imposing a 10 percent cut in basic research programs. Against this background of deepening institutional crisis,⁷⁸ the Cooper Committee proposed a new approach to extramural administration using Institute-sponsored programs rather than organizationally distinct funding mechanisms. The Committee recommended seven program management innovations, chief among which were establishing NIH-wide standard procedures for Institute programs (Recommendation 2) and consolidating grant and contract responsibilities in an Office of Extramural Services attached to OD/NIH (Recommendation 7). The proposed office would also conduct annual program reviews, establish criteria for employing grants or contracts, develop peer review procedures for contracts, and institute a comprehensive set of procedural regulations encompassing all extramural activities.



41. Biophysics and Biophysical Chemistry B Study Section, 1971. Dr. John B. Wolff, (seated, far left), Executive Secretary; Dr. Bruno H. Zimm, (seated, second from left), Chairman. Courtesy of Sam Silverman.



42. Arthritis and Metabolic Diseases Program–Project Committee, 1973. Dr. Harold M. Davidson, (seated, third from left), Executive Secretary; Dr. Stephen M. Krane, Chairman. Courtesy of Sam Silverman.

Although different venues were stipulated for grants and contracts, the Committee envisioned dual review mechanisms “applied to both grant applications and contract proposals,” with strong oversight exercised by program managers.⁷⁹

Peer review, which the Committee was eager to apply to contract research, played only a marginal role in implementation discussions until March 31, 1973, when OMB circulated a draconian assessment calling for abolition of the study section function.⁸⁰ Acting NIH Director Sherman’s rebuttal memorandum on April 13, 1973, gave defense of peer review integrity the highest priority. The Administration’s attack had the effect of rallying grantee support, as did an Institute of Medicine address by Dr. Phillip Handler, President of the National Academy of Sciences.⁸¹ More significant in staying OMB’s hand was the Administration’s Watergate controversy, which forced the resignations of the President’s Chief Domestic Advisor, John D. Erlichmann, and the White House Chief of Staff, H.R. Haldeman, on April 30. HEW Secretary Casper W. Weinberger and Assistant Secretary for Health Charles C. Edwards then pronounced the peer review system sound, and in July they assured an intramural assembly in the Clinical Center auditorium that peer review would be maintained and that anxieties about further budget cuts could be put aside.⁸²

Implementation planning for the Cooper Committee's ambitious program of administrative reform went forward fitfully during the summer of 1973, without strong consensus on key procedural issues. Institutes with large collaborative programs resisted centralized administration by an Office of Extramural Services (OES) inhibiting autonomous program management, while contract administrators protested the lack of procedural detail and the unwillingness to write basic regulations.⁸³ The



43. Metabolism Study Section, 1972. Dr. Robert M. Leonard, (seated, far left), Executive Secretary; Dr. Oscar B. Crofford, Chairman. Courtesy of Sam Silverman.



44. Physiological Chemistry Study Section, 1975. Dr. Robert L. Ingram, (seated, third from left), Executive Secretary; Dr. Edward C. Heath, Chairman. Courtesy of Sam Silverman.

Division loyally supported centralizing data collection, extramural administration, and contract receipt at OD/NIH, but held that the Committee's preference for program relevance review before technical merit review posed a "severe disadvantage" to the primary review function.⁸⁴

Anticipating a lengthy policy debate, incoming NIH Director Dr. Robert S. Stone, a traditionalist on peer review issues, ruled against establishing an OES. He also returned to DRG the receipt function for contract proposals, manual issuance of handbooks, and control of data capture and evaluation. Director Stone rejected implementation programming developed by the Committee's Working Group on Projects — particularly stipulations requiring that all projects be identified with particular NIH program interests and for consolidation of a "single organizational locus" of program management in OD/NIH.⁸⁵ This decision comported with the view of Assistant Secretary for Health Edwards that the extramural system was "governed by the public will" and, thus, was not amenable to autonomous, centralized administration, which limited access from Congress or the Executive Branch.⁸⁶

Although the Cooper Committee had laid the groundwork for program management of the extramural system, continued progress during 1974 was largely the work of ADERT Thomas E. Malone, who organized a Seminar on Peer Review to identify unresolved policy questions and to elicit an internal consensus on procedural modifications.⁸⁷ During the February 25-27 sessions at the Dulles Marriott Hotel, working level administrators agreed that Institute staff, not study sections or Councils, had primary responsibility for program decisions. Centralized review in one organization was rejected in favor of a flexible combination of DRG and Institute review functions, and preparations were made to protect reviewers' confidentiality from disclosure demands generated by the new Freedom of Information Act.⁸⁸ Subsequent discussions were summarized by the ECEA Planning Committee

in a December 1974 final report, which recommended establishing a joint ECEA/DRG standing committee to resolve review problems; an OD monitoring group to develop new procedures; and a larger "study team on peer review" to prepare a comprehensive, NIH-wide policy.⁸⁹

Peer review emerged as the key feature in NIH extramural policymaking during 1975 because the transition to the public accountability initiated by the 1974 "Sunshine Laws" portended wholesale revision of the merit review process.⁹⁰ For the new Grants Peer Review Study Team (GPRST), formed in April 1975 to evaluate these legal constraints and to devise procedural alternatives, the immediate impetus was DHEW issuance of operating regulations, which threatened "potentially incisive changes to the NIH system."⁹¹ Dr. Ruth L. Kirschstein, NIGMS Director and Study Team Chairperson, widened the focus:

How can a system, devised in an era of elitism, of secrecy, and of economic growth ... be adopted to an era in which stress is on equal opportunity, openness, and limited availability of funds?... If such a system proves unworkable, what system must be substituted?⁹²

The first charge to the 15-member GPRST, which consisted entirely of serving NIH officials, was to assess peer review by "self-examination," a marked departure from the traditional reliance on senior, non-NIH opinion. The more fundamental work, which extended over the next 2 years, was to develop new procedures governing appointments, staff coordination, conflict of interest, confidentiality, and quality assurance.⁹³

The Study's Phase I was largely survey research, a consensus-building exercise in which 1,354 NIH review group members were polled about the system's strengths and weaknesses at the 1975-1976 winter meetings. The Team also mailed questionnaires to 30,000 grantees, specialists, and known critics, 1,493 of whom responded or gave testimony at public hearings in San Francisco,

California, Chicago, Illinois, and Bethesda, Maryland, during February 1976. The responses, substantially favorable, were analyzed in detail and discussed by five subcommittees in the context of current operating rules, legislative enactments, earlier policy recommendations, and background studies.

The upshot was a catalogue of 58 procedural recommendations presented to NIH Director Donald S. Fredrickson in December 1976. Critical innovations included proposals for a permanent Grants Appeals Board and Ombudsman, and for amendments to the Freedom of Information Act, Federal Advisory Committee Act, and Privacy Act restricting public access to review activities. In keeping with the recommendations issued by an Executive Secretaries Review Activities Committee (ESRAC), GPRST also proposed immediate steps to alleviate the workload crisis, including authorizations for the Director, NIH, to



45. Dr. Donald S. Fredrickson, NIH Director, and Dr. Ruth Kirschstein, NIGMS Director, with Dr. Paul Berg, a leading authority on recombinant DNA, 1975. NIH regulations for DNA research were implemented through the Division's registry of DNA projects and a separate IMPAC tracking system.

Courtesy of the National Library of Medicine

establish new review groups, to set maximum workloads for each review group, and to split study sections as needed, as well as motions to consider queuing applications and contracting out review services.⁹⁴

Phase II entailed preparation and publication of detailed analyses of commentaries and survey material. In February 1978, Dr. Fredrickson accepted 33 of the final list of 69 GPRST recommendations, beginning with automatic provision of summary statements to all applicants and public solicitation of review group nominees. No action was taken on a normalization convention for priority scores despite a GAO interest in normalization, and the Grants Appeal Board was deferred pending further study.⁹⁵ Apart from these shortcomings, the Study Team made substantial progress in codifying peer review procedures and in restoring the credibility of scientific review, and it had also broken new ground in emerging areas of quality assurance. Over 95 percent of GPRST respondents had rated the review process “good” or “excellent,” and large majorities had rallied against both congressional demands for public access and critics charging bias, mediocrity, or cronyism. There was now an internal consensus that dual review required a clear separation of review and program functions, and DRG was held up as a review model for the Institutes to emulate.⁹⁶

DRG also regained influence in extramural policymaking by having its priority issue — alleviating the workload crisis — brought to the top of the GPRST agenda. The Division was responsible for much of the staff work behind GPRST review procedure innovations, through the ESRAC.⁹⁷ On a more fundamental level, the GPRST effort generated a broad internal consensus around one issue that had become vital for the Division in the post Shannon era — the separation of program and review. With a singular sense of accomplishment, the Phase I Report announced that the integrity of the extramural system now depended on “having the review apparatus centralized in one orga-

nizational locus” and program managers in another. Criticism of the new large-grant mechanisms as less meritorious and less rigorously reviewed could be put to rest, the panel argued, by maintaining separate program and review organizations within an Institute, as NHLBI and NCI had recently done.⁹⁸ DRG’s centralized and separate review function was, thus, a model to be emulated by the Institutes and a pragmatic solution to the problem of program bias in the award process.

The adoption of the Division’s longstanding position on review objectivity as the central feature of the emerging NIH concept of peer review was a well-deserved reaffirmation of the Division’s basic values and the contributions of its staff to the biomedical enterprise. There were other signs as well, which indicated that an evolutionary shift had occurred, providing the basis for consensus. In 1973, the Cooper Committee stipulated that technical merit review for contract awards should be conducted “by persons outside the immediate organizational component responsible for the project award and management.” The concept did not survive the project implementation phase at the NIH level, but Dr. Cooper put “separation of program from review” at the heart of the centralized NHLBI peer review system, which he organized in 1976.⁹⁹ The concept also appears in a January 1973 chapter of the PHS Grants Administration manual, which required that

all discretionary grant awards must be based of a system of objective review involving persons outside the immediate organization in which the grant authority is vested.

The issuance was approved by the Secretary on February 27, 1973; an NIH issuance is not recorded until November 6, 1982. After Dr. Stone’s June 1974 decision ending the Cooper Committee implementational phase, the working groups received a second DHEW draft issuance, which prescribed separate review and program functions as an operating principle in grant evalua-

tion. The decision record indicates that the NIH representatives were not fully committed on the issue and that the initiative came from the Department. "While it is desirable to separate review from program management," Dr. Malone concluded, "NIH does not have the staff resources to effect the separation where it does not exist."¹⁰⁰

What made the evolution unlikely and unexpected, even for the participants, was the conventional belief of the Shannon era that review procedures established for the project system were not appropriate for large, institutional grants. It was only as the expansion of directed (contracted) programs began to lose force in 1974¹⁰¹ that the durability of the project system became apparent, and the validity of its terms of reference was once again accepted.

The Conflict Within: Peer Review Controversies, Public Access, and the Search for a New Research Paradigm, 1976 - 1985

During the last few years, there has been a slowly spreading realization within the biomedical research community that the enterprise not only has stopped growing but actually has begun a contraction of unpredictable duration. Competition for funds from the NIH and other sponsors, intensifying year by year, now stands at an unprecedented level, and shows no sign of abating. Never before have so many established investigators faced so much uncertainty about their longevity as active scientists. Never before have so many novices faced so many disincentives to entering or continuing a research career.

Dr. William F. Raub, NIH Associate
Director for Research and Training,
strategy paper, 7/26/82¹

With the demise of the Nixon Administration and the winding-down of the U.S. war effort in Vietnam, grant activity again began to rise, and the biomedical community resumed its assertive role in relations with the political system. The Division received an "unprecedented" wave of 25,448 competing and noncompeting research applications in FY 1974, touching off a 5-year workload expansion that brought the volume of competing applications from 8,806 in 1973 to 14,816 by 1978.² The election

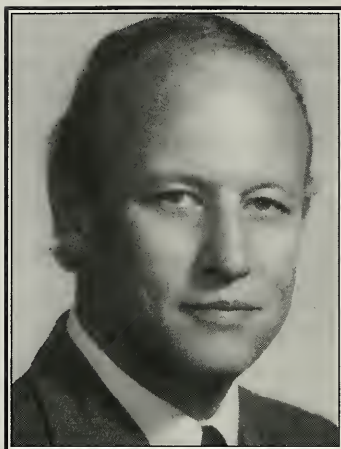
of the solidly Democratic 94th Congress in 1974 and the reform-minded Jimmy Carter to the Presidency in 1976 disposed many NIH grantees to expect Federal health research spending to rise, given the new President's commitment to basic research. But the Carter Administration and the 95th and 96th Congresses saw a greater danger in Medicare/Medicaid budgets rising at 15 percent yearly, and a consensus on containing health care costs kept biomedical research spending nearly level in constant dollars until 1983.³ Facing projected competing grant success rates averaging 29.4 percent by 1982, the grantee community became disaffected and susceptible to wide-ranging criticisms of the peer review system.⁴

Biomedicine's political crisis abated during the 1970s, but there would be no general resolution; in effect, the earlier external conflict between science and the Nixon Administration evolved into an internal conflict for the integrity of the biomedical enterprise. The forced resignation of NIH Director Robert S. Stone in January 1975 and the administrative conflict that continued to swirl around the Office of the Secretary, DHEW,⁵ were evidence that the political autonomy of NIH had been compromised. The authority structure of congressional health committees became more diffuse and less responsive to NIH program and budgetary needs, while the legislative calendar loaded up with special interest bills, which fragmented the categorical concept and opened NIH operations to micro-management from Capitol Hill.⁶ The Federal health science coalition, which had governed the postwar expansion of NIH, was in an advanced state of decay. Representative Daniel L. Flood (D-Pennsylvania), chair of the House Labor-HEW Subcommittee and successor to John Fogarty, lost his chairmanship in 1979 for accepting bribes intended to win Federal grants for his constituents. In the Senate, Warren Magnuson of Washington provided leadership on health science issues by virtue of his chairmanship of the Appropriations and Labor and Public Welfare Subcommittees, but the weakness of the committee system was apparent in the circulation of a fabricated hearing

record in October 1976 by longtime Magnuson staffer Harley M. Dirks.⁷ Public confidence in the biomedical enterprise slipped downward, reflecting the Ford Administration's overreaction to the possibility of a swine flu epidemic in 1976, as well as a lengthening series of scientific misconduct cases in the public press.⁸

None of this dampened congressional interest in biomedical advances, particularly recombinant DNA discoveries and a wide variety of clinical applications. No longer deferring to an autonomous NIH leadership as in the Shannon era, congressional committees became more invasive and directive in their recommendations, more inclined to regulate than to facilitate. A cycle of more assertive oversight began in August 1976 when the House Health and Environment Subcommittee circulated the Banta Report, which proposed that NIH adopt a "new paradigm," integrating behavioral and environmental factors into chronic disease research. The subcommittee also requested procedural improvements, such as the appointment to study sections of reviewers under 36 years of age and the termination of continuation grants that failed to show research progress.⁹ Senator Edward Kennedy's 1979 Health Sciences Promotion bill sought to instruct the NIH director to appoint lay persons to five study sections and to set up an investigator appeals process, and the bill subjected all Institutes except Cancer and Heart to renewal of authorization. The scientific community at large feared that such initiatives, while helpfully intended, encumbered the research process with bureaucratic and political constraints and diminished the operational autonomy of Federal science agencies. These impacts registered in a detailed evaluation of NIH extramural administration, coauthored by Division analyst Joan Porter in 1977.

"NIH was once a developer of policies and procedures emulated by other PHS agencies," the report observed, "but it is now in a position of reacting to PHS and Office of the Secretary initiatives and fending off what we deem to be inappropriate attacks on the systems and procedures that have served NIH well."¹⁰



46. Dr. Donald S. Fredrickson, Director, NIH, 1975 – 1981.
Courtesy of the NIH Historical Office.

Dr. Donald S. Fredrickson, who took over as NIH Director on July 1, 1975, countered these adverse trends with wide-ranging programs of reinvigoration and renewal. A leading NIH clinical investigator specializing in diseases of lipid metabolism, Dr. Fredrickson had been Clinical Director and then Director of the Heart Institute during 1961-1968, and he had also served on the Cardiovascular Study Section during 1959-1962.¹¹ Given the prevailing current of budgetary stringency, Fredrickson's highest priority was stabilizing support for basic research, eventually through a separate appropriation for basic research managed through the Office of the Director.¹² At the behest of DHEW Secretary Joseph A. Califano, Dr. Fredrickson organized the National Conference on Health Research Principles in October 1978 to build support for a new consensus in biomedical research between Congress, the Department, and the academic research community. The Conference and three subsequent meetings of the Director's Advisory Committee developed a commitment to sustain the then-current level of Federal funding for extramural research — at least 5,000 competing awards annually. According to Lewis Thomas, the October 3-4 meeting developed "solid agreement" on numerous points, including a conclusion that the

peer review system, jeopardized by an excessive burden of paper-work, “must somehow be restored to the efficiency of preceding decades.”¹³

Although the Conference generated ample supportive testimony and a closing pronouncement of success by Secretary Califano, a formal review of the conference by the Institute of Medicine was highly critical. Unofficial sources recorded vehement dissenting judgments from participants who expected a formal planning exercise. To a reporter, Harvard psychiatrist and Conference panel leader Leon Eisenberg characterized the proceedings as a “damn circus” which imposed HEW regulatory interests upon fundamental research and evaded the critical need for more Federal funding.¹⁴ In the Institute of Medicine’s review of the Conference, Nobelist Joshua Lederberg, another panelist, pointed to the lack of staff work and operational issues as evidence that the conference was staged as a public relations exercise. The Institute of Medicine review objected to the failure of the Conference to insist on higher funding levels and a permanent planning body. In a cover letter dated March 21, 1979, Fredrickson accepted the criticism and declared further efforts to solidify a national program to be “completely impractical.”¹⁵ Califano resigned without approving the research principles. Although the 5,000-grant ceiling was accepted in subsequent budgeting, consensus within the scientific community would remain illusive until funding levels rose and more progress was made towards resolving fundamental issues.

5.1

“On Peer Review Hangs the Whole Game”¹⁶ : The Workload Crisis and the Expansion of Scientific Review in the Fredrickson Era, 1976 – 1981

DRG Director Dr. Stephen Hatchett died suddenly in Slanesville, West Virginia, on August 22, 1976, and his responsibilities were assumed by Dr. Carl D. Douglass, Deputy Director



47. Dr. Carl D. Douglass, Director,
Division of Research Grants, 1977 – 1985.

since 1972. An Arkansas native with a background in nutrition and biochemistry, Dr. Douglass inherited a loosely structured organization, which had been supervised from 1969 until 1974 by the NIH Associate Director for Research and Training (ADERT). Division resources were so drawn down that the new ADERT, Dr. Thomas E. Malone, doubted that DRG could successfully monitor peer review.¹⁷ The two principal DRG branches, Scientific Review and Statistics and Analysis, were poorly coordinated. All components were cramped for space and stressed by rising workload pressures.¹⁸ Although the “explosive” rise in application volume had slackened by April 1977, when the new DRG Director received his permanent appointment, the Division would spend the next 5 years adapting to the doubled workload and the myriad administrative requirements that followed from it.¹⁹ Peer review emerged as an institutional system whose preservation was no longer in doubt; in the process, however, the independent work style associated with multiple, self-contained working units was left largely behind.²⁰

NIH options in the workload crisis were severely constrained by Carter Administration cost containment programs. Chartering new study sections ran against the President's August 1977 goal of eliminating 40 percent of the 1,189 Federal advisory committees. The Division lost two study sections in 1977, and the addition of four new study sections in 1979 came 4 years behind the rolling crest of new applications.²¹ DRG's budget held steady at about \$14 million, due indirectly to OMB insistence on "maintenance" funding levels. Chairman's Grants were funded separately through the NIGMS appropriation, and a modest expansion (annualized at \$3.6 million to \$4.4 million) was projected for 1979-1981.²² Dollar increases commensurate with the 100 percent rise in applications processed — the standard recommended by the October 1976 Task Force Study of NIH Central Service Activities — were simply not forthcoming.

The dearth of available resources applied to personnel as well. Full-time employees on duty at DRG increased slightly from 398 in 1973 to 406 in 1982, notwithstanding a Senate Appropriations Subcommittee recommendation to add 40 positions in project review or Dr. Douglass's request for 40 positions in fellowship administration.²³ Moreover, Douglass's staff were painfully aware that Institute extramural staff had grown by 83 percent in the decade following 1968 while the Division's strength suffered a 28.1 percent attrition.²⁴

Workload factors added to the stress and tension in the peer review system prior to 1980-1983. This was ameliorated somewhat in 1983, when nine study sections and 203 reviewers were added to ease the Division's administrative burden. According to an internal study circulated from the Association of American Medical Colleges in May 1978 by former Deputy Director Dr. John Sherman, study sections in 1977 averaged 355 reviews per year or 130 above the optimal figure. Though rare, some review meetings were running as long as 6 days. Resignations of members totaled 31 for 1977, and young scientists were being advised to

decline appointment — a fact that was verified for Dr. Fredrickson during four meetings with study section chairpersons in the fall of 1979.²⁵ In Sherman's view, the scientific community and Congress were "largely unaware of the complexity and portentousness of this situation." Initial NIH rebuttals of peer review critics avoided the question of workload pressures while extolling the "extremely equitable" distribution of awards.²⁶ The integrity of peer review might still be preserved, Sherman argued, by informing the public about the workload crisis and then lobbying the Executive Branch to implement key changes allowing study section expansion. Sherman also favored restricting investigators' rights to obtain summary statements under the Privacy Act.

What frustrated study section expansion in the ensuing 5 years was the evolving set of new peer review regulations, written to facilitate public access and managerial intervention by the Department. Within the Division, Dr. Douglass' staff sought to reduce the number of applications reviewed by each study section by implementing procedural changes, following the guidance of the Grants Peer Review Study Team.²⁷ Taking a more forward approach, Dr. Fredrickson, in January 1978, proposed to radically expand the number of review groups by having the Department modify 25 or 30 charters, allowing appointment of up to 40 members in each group. Subcommittees could then be split off to handle overloads in particular review rounds. The Department approved Fredrickson's "flexible study section" concept in principle, and in April accepted his proposal to turn the Genetics, Radiation, and Reproductive Biology study sections into "flexibles" and to create a new Chemical Pathology study section.²⁸ Implementation lagged, however, because charter modification required an OMB ruling on the applicability of the Federal Advisory Committee Act of 1976. Another problem area was the validity of using consultants for ad hoc reviewers without conflict-of-interest screening, which the Department's Peer Review Regulations mandated for all reviewers. When Secretary Califano announced establishment of four new study sections (Mammalian Genetics, Biochemical

Endocrinology, Diagnostic Radiology and Nuclear Medicine, and Chemical Pathology) on February 12, 1979, no flexibles were listed. By July 1981, the number of subcommittees had grown from 6 to 25 and would reach 41 by 1986.²⁹ Accounting for about one quarter of all reviews, subcommittees became the mechanism for study section expansion in the 1980s.

Additional impetus to expand the study section system came from the Division's Scientific Review Branch and Deputy Director S. Stephen Schiaffino. During 1979, while OMB kept five proposed charters under consideration and NIH prepared seven more for research grant review groups and three for fellowships, the Division put into operation five ad hoc review groups and three fellowships panels to ease application pressures on regular reviewers.³⁰ These groups continued functioning during the seven-round interim until chartering was completed in 1981, and in several instances, an ad hoc review group served as the nucleus of a study section. Three study sections converted to flexibles in January 1981. Each had an additional executive secretary assigned to conduct special reviews in October 1979.³¹ Ad hoc reviewers were added to the four busiest study sections to help handle excessive workloads ranging from 168 to 191 applications per round in FY 1979, at a time when 75 applications were considered optimal.³² Other review procedure innovations attributable to the Division included a revised application form (PHS-398), which limited the methodology portion of the project to 10 pages, and the test of a vote-counting machine. This device was intended to electronically calculate and display scores during study section meetings and to allow re-voting if the members felt the score and distribution were not appropriate.³³

These work-process innovations were part of a larger effort by the Division to modernize review services and accommodate the new requirements of peer review. The first task was to build administrative and management capability into the organizational structure of the Scientific Review Branch (SRB), which in 1976 was still a loosely-structured collaboration between roughly 50

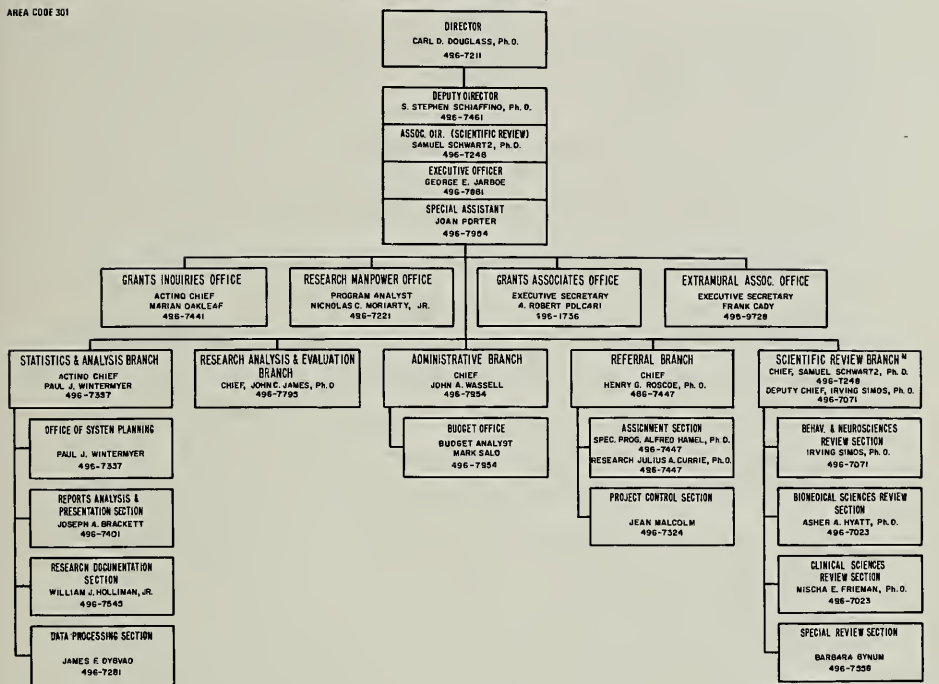
highly independent executive secretaries and Dr. Schiaffino, then DRG Associate Director for Scientific Review. Three Assistant Branch Chiefs were appointed in October 1976 to supervise reviews and, with lead grants technical assistants, to manage the day-to-day operations of the study sections.³⁴ The balance of authority, however, remained with the executive secretaries, whose highly independent work style complicated the management of SRB, then one of the largest branch organizations in Federal service.³⁵

After Dr. Schiaffino became DRG Deputy Director in 1978, Dr. Samuel M. Schwartz was brought over from NHLBI to complete the reorganization. The new Associate Director established an eight-person administrative office, shared by SRB and the Referral Branch, for paper handling, word processing, and training new grants clerks.³⁶ In July 1981, the Branch added three new review sections (Biological Sciences, Physiological Sciences, and Manpower Review) and formalized a fourth for Special Reviews. The study sections were clustered into six operating review sections responsible for the quality control of the review process and the supervision of study section personnel.³⁷ A similar expansion of operating authority occurred within the Referral Branch (RB), supervised by the Associate Director for Scientific Review. In new functions statements drawn up in January 1980, the RB Assignment Section claimed authority to assign applications to review groups and awarding organizations, based on a recent procedural innovation routing Institute requests through a single coding point. The weekly meetings of Dr. Schwartz, the RB Chief, the SRB Assistant Chiefs and Dr. Schwartz's Deputy, Dr. Irving Simos, known informally as the Front Office Group, emerged as the focus of review administration within the Division.³⁸ Additionally, there was a monthly meeting of all executive secretaries.

Apart from elevated workloads, the expanded review system had to respond to a variety of procedural changes originating outside DRG. Reorganization of the Institutes into program areas

DIVISION OF RESEARCH GRANTS, NIH

AREA CODE 301



* INITIAL REVIEW GROUPS LISTED OTHER SIDE.

48. DRG Table of Organization, 1979.

had given new importance to Institute program staff. More care had to be taken in liaison efforts with program staff, and the separation of program and review had to be more rigorously enforced to ensure objective technical review. The release of summary statements to applicants brought more thoroughgoing changes. Reviews became more tutorial; guidelines against conflict of interest, abuse of animals, abuse of human subjects, and misuse of data became more rigorous; and the selection process for new members was subject to more stringent affirmative action criteria.³⁹ For SRB review staff, the leading professional issue was merit pay, which was first implemented in 1981 after a special committee of executive secretaries defined evaluating criteria and drafted procedural rules.⁴⁰ The combined effect of procedures instituted after

1978 made review more manageable and more professional, but it also increased the administrative burden on grantees and reviewers alike.⁴¹

The more fundamental challenges to NIH grants peer review in the 1970s came from the scientific community. The Grants Peer Review Study Team and earlier studies confirmed the consensus belief that peer review was objective, unbiased, and necessary.⁴² However, in the succeeding 5 years, as the success rate for new competing projects dropped from 40.2 percent to 29.4 percent and the release of summary statements to investigators became routine, charges of favoritism and institutional bias again resounded.⁴³ Although the Division was able to show that awards to new R01 principal investigators rose from 8.1 percent to 13.7 percent of all investigators during 1968-1978, the impression of bias favoring established paradigms and prestigious pedigrees was harder to shake off.⁴⁴

To assist with funding decisions, the Institutes in 1971 reached for a procedural expedient — normalization of priority scores. Extramural administrators had long understood that the three-digit scores, which study sections attached to approved applications, were mathematically imprecise and that variations in scoring and success rates among study sections could not be explained in terms of scientific merit criteria alone.⁴⁵ To minimize skewing effects when applications from high-scoring and low-scoring study sections were interdigitated for each Council, the Division began transforming raw priority scores on a Gaussian curve with a common mean of 250 and standard deviation of 70. Both raw and normalized scores were entered for each application to allow Institutes the latitude of using either ranking.⁴⁶ This practice of dual scoring and the use of either one or both for funding decisions caused confusion in the scientific community and variance of funding decisions among the Institutes. In 1976, the Grants Peer Review Study Team called for a single notation and score convention. Three years later, an implementation committee chaired by Dr. John Dalton, NINDS, recommended adopting the

1971 normalization scheme and recommended that Institutes make greater use of program relevance consideration in funding decisions. It was hoped that a common scoring system would yield similar distribution patterns for each awarding unit and compensate for variations in rating behavior by review groups.⁴⁷

Continued use of raw scores by half the Institutes became an obstacle to progress, however. In November 1979, Dr. Fredrickson asked for advice for adopting a universal rating system. Seven of the 11 Institutes favored discontinuing raw scores, but re-examination of award data revealed the Gaussian curve no longer approximated the distribution of raw scores where limited funding had driven the award rate down significantly.⁴⁸ Of equal importance was the House Appropriations Committee's decision to fund FY 1980 grants to a pay line of a score of 212, regardless of the conventions used. The Heart Institute, which funded grants using normalized scores, claimed its allotment was \$12 million less than the amount receivable with raw scores. "We do not intend to go through another appropriation cycle with two different priority sources," NHLBI Director Dr. Robert Levy told a reporter.⁴⁹

In January, Dr. Fredrickson ruled that Institutes would discontinue using normalized scores and rely on raw scores. However, his ruling also allowed Institutes to develop "techniques or procedures suitable to its own unique circumstances,"⁵⁰ and in September, NHLBI presented an alternative system of numerical adjustment based on percentiles. The new system achieved distribution effects similar to normalization, but without the curves or generated values, and in 1987 became accepted as the single NIH scoring convention.⁵¹

5.2

Support for a Changing NIH Mission: Assurance Activities, the Evaluation Function, and Information Services, 1969 - 1981

When Dr. Fredrickson stepped down as NIH Director on June 30, 1981, neither Congress nor the scientific community had regained confidence in peer review. The Health Subcommittee of the Senate Labor and Human Resources accepted arguments that the system was biased against innovative work and young investigators. The major biomedical research legislation of the period, Senate Bill 988, provisionally linked study section expansion with a demonstration project putting lay members on five NIH study sections.⁵² Left out of the final version that became law in January 1980, this provision reflected deepening skepticism toward the biomedical enterprise. It tended to neutralize the high marks previously accorded NIH peer review officials for cooperation with Congress for adhering to dual review in the National Science Foundation (NSF) hearings in 1976. The full range of investigator complaints, which focused on diminishing opportunities and growing administrative burden, was aired in 1982 at meetings of the National Cancer Advisory Committee and the President's Cancer Panel.⁵³

Under Dr. Douglass, the Division had begun to adapt to the requirements of this new public skepticism of science. Watershed post-Watergate legislation — the Privacy Act of 1974, the Freedom of Information Act, and the Sunshine in Government Act of 1976 — mandated a widening array of public access provisions in Federal science, which, in turn, generated administrative procedures, compliance activities, and requirements for data capture and evaluation.⁵⁴ The Division managed the NIH Inventory of Clinical Trials and the payback and compliance features of the National Research Service Awards Program.⁵⁵ Oversight of HEW laboratory animals safeguards was added in 1975, and certification for DNA recombinant research in 1976.

Expanding on the Division's experience with human subject protection assurance and civil rights certification in the early 1970s, the new assurance functions provided more venues for cooperation with other NIH extramural entities. However, they also added to the growing complexity of information processing and to the information requirements of the grant application, PHS Form 398.⁵⁶ In keeping with institutional reorientation throughout NIH, the Division developed out of its traditional service functions a responsibility for "quality control management" in peer review, statistics, and evaluation.⁵⁷

The evaluation function, which originated in the 1963 reorganization as a small offshoot of the Statistics and Analysis Branch, served a vital Division function in the Fredrickson era as a proving ground for new and expanded research grant statistics and analysis. Startup operations for the Research Analysis and Evaluation Branch (RAEB) in 1971 included preparation of 12 research-status reports, mostly for ADERT, as well as reformulation of the NIH Central Scientific Classification Code, a retrieval system that categorized NIH research activities.⁵⁸ In 1973, the



49. The Westwood Building, seat of DRG operations from 1963 to 1995, in October 1981.

Branch publicized in *Science* a statistical survey of NIH principal investigators and installed the first MEDLINE terminal in the Westwood Building. Initiation of the annual NIH Inventory of Clinical trials in 1975 brought the Branch within the ambit of the categorical Institutes, which quickly became the predominant client interest. In 1978, RAEB collaborated with the Office of Program Planning and Evaluation in developing the primary tool for Dr. Fredrickson's Forward Reports, the analytical matrix known as SATT (Science Base, Clinical Applications, Transfer, and Research Training).⁵⁹ As a staff resource for OD/NIH, OD/DRG, and "various NIH Directorates," the Branch undertook long-term analytical projects involving transfer of NIH applied and basic research program data to OMB and NSF. It also assisted Institute efforts to develop automated reporting programming and to adopt the Division's CRISP database for NIH-wide client use.⁶⁰

The Division's other statistical resource organization, the Statistics and Analysis Branch, concerned itself principally with maintaining the extramural database and producing recurring and special reports. SAB operations were closely tied with those of the Referral Branch, to assure continuous data capture from the stream of applications and to facilitate production of a wide variety of pre-award transaction records. Its reporting activities focused on ADERT and the Division of Financial Management in OD/NIH. There was also a wide variety of special projects for the Branch's programming and analytical sections. Looming over all other SAB activities was the IMPAC database. By 1982, IMPAC and CRISP were backed by a growing array of single-use systems — the Committee Management System, the Trainee Appointment File, the National Research Service Act Payback File, and the Institution Profile File.⁶¹

In the Fredrickson era, SAB gradually strengthened its focus on the IMPAC/CRISP database just as the initial wave of interactive technology became available. In 1975, the Branch developed and put into operation a new IMPAC file, the Human Subjects

Tracking System, to monitor grantee compliance with PHS regulations. With more new CRISP files ready for activation and online access to CRISP a clear success, the Branch began experimenting with an “institution interface” system, which would eliminate the need for weekly transfers of data by magnetic tape.⁶² In 1977, SAB set up the NIH Repository of Recombinant DNA Projects and the Research Contract Manpower Information System. User data fields were added to IMPAC at this point to allow Institutes to independently generate award notices. By 1979, IMPAC had been successfully redesigned, and the Institutes were beginning to draw their own pre-award data. SAB analytical projects became more far-reaching, as in the Competitive Research Awards Model (TCR), which predicted award and success rates 2 years into the future.⁶³

5.3

The Division in the Wyngaarden Era: Tight Budgets, Deregulation, and the Computerization of Data Capture, 1982–1985

Shortly before Dr. James B. Wyngaarden became NIH Director on April 30, 1982, the Division began a fiscal ordeal that revealed in graphic detail the institutional roots of the problem of peer review. In order to staff the 11 new study sections organized that year, the Division had hired 10 new executive secretaries and grants assistants, the first significant DRG staff expansion in 2 decades.⁶⁴ However, the Division's annual operating budget still stood at \$14.7 million, essentially unchanged since 1979. Since full-time equivalent (FTE) authorization had preceded the allocation of new funding, Dr. Douglass in mid-April requested and received from the NIH Management Fund a \$1-million augmentation; but despite stringent cost controls, the operational deficit grew by an additional \$800,000 by the end of the fiscal year. The costs in unit morale were high. Already, the professional staff



50. Physical Biochemistry Study Section 1980. Dr. Jeane N. Ketley, (standing, far right), Executive Secretary. Courtesy of Sam Silverman.



51. Neurology A Study Section, 1979. Dr. William E. Morris, (seated, third from left), Executive Secretary; Dr. Stanley H. Appel, Chairman. Courtesy of Sam Silverman.

considered themselves “second-class citizens,” Douglass reported on September 27, because staff training and attendance at professional meetings had been sharply curtailed. But there were more indignities. The Division’s second source of operation funds, the Chairman’s Grants, were “prescribed” and slated for elimination by OMB in 1978. An extramural committee determined in January 1981 that this “cornerstone of peer review” could be replaced by another mechanism, the professional services contract, but that implementation would require 11 additional FTEs to administer the contracts.⁶⁵ Thus, the plan was not implemented.



52. Biomedical Endocrinology Study Section, 1981. Dr. Norman I. Gold (seated, third from right), Executive Secretary; Dr Darrell N. Ward, Chairman. Courtesy of Sam Silverman.

As a user of NIH Central Services financing, DRG’s predicament was linked to that of the Clinical Center, by far the largest account in the Central Service user fund. In December 1981, when the Clinical Center faced curtailment of services because of inadequate allotment from the Management Fund, a special committee began examining alternatives, including direct appropriation from Congress. The committee quickly dismissed the direct appropriation option because “the BIDs (Institutes)



53. Neurology B Study Section, 1980. Dr. Willard L. McFarland, (second row, far left), Executive Secretary; Dr. Robert A. Martin, Chairman. Courtesy of Sam Silverman.

could lose leverage in the areas of clinical research conducted there.”⁶⁶ A special subcommittee examined DRG’s relationship to the Fund and came up with an alternative to the inequitable “formula” used since 1967, whereby each Institute contributed according to awards paid that year. The old formula undervalued DRG services by counting awards rather than applications reviewed, and by making no provision for statistical, assurance, and information activities. That said, the committee concluded that no changes were needed and then chastised DRG for operating “a bit too independently for a service organization.” Its detailed prognostications questioned whether study sections should be tutoring unsuccessful applicants and suggested that intake should be limited by triage or queue.⁶⁷ Douglass felt obliged to accept the report and yet another oversight body — the EPMC

User Subcommittee. For the record, he did insist that while the Division was a service organization, “it should not be assumed that it is a servant organization.”⁶⁸

The Division’s prospects brightened considerably after Wyngaarden’s investiture in April 1982. A clinical research specialist in the genetics of gout and the regulation of purine biosynthesis, Dr. Wyngaarden had written grant applications, received grants, and sat on study sections. He had a deep personal interest in the extramural system and was strongly committed to training the next generation of clinical investigators.⁶⁹ At his first meeting with Division staff in October 1982, Dr. Wyngaarden projected that the 5,000-grant funding minimum would be met for FY 1983, that peer review would stay alive and healthy, and that his office would not condone the reimposition of political clearances on study section members. By December 1983, he was able to claim 5,300 grants funded and an upward trend in the NIH appropriation, which would soon regain the peak level of FY 1979. For the Division, this trend lifted the Management Fund allotment from \$14 million to \$19 million by FY 1985 and the Scientific Review and Evaluation grants total from \$5 million to \$7 million.⁷⁰

Extramural policy initiatives for the remainder of the 1980s reflected Dr. Wyngaarden’s collaboration with Dr. William F. Raub, who was appointed NIH Deputy Director for Extramural Research and Training in June 1983. The new policy team continued the gradual consolidation of extramural authority in the Office of Extramural Research and Training by appointing the Review Policy Committee to be the “focal point for trans-NIH peer review issues.”⁷¹ Faced with the need to “stretch the research dollar,” Wyngaarden and Raub experimented with administrative measures to relieve operating inefficiencies, thereby improving the quality of review and to reallocate resources internally to meet special priorities. Such initiatives typically grew out of current practices or were extensively tested for feasibility before implementation.

One expedient device for rapidly expanding the number of DRG review groups in 1982 led later to the adoption of the NIH Reviewers Reserve. Although the Reagan Administration barred issuance of additional flexible study section charters in 1981, Wyngaarden's staff discovered that several sections could operate from the same charter, and the Division's inventory of initial review groups quickly rose from 62 to 88 in 1985, with another 9 registered as ad hoc bodies.⁷² The ad hoc members expanded the consultant pool, but were not allowed to vote or provide a priority score in the review session. However, the practice was difficult to enforce and did not meet General Accounting Office (GAO) standards.⁷³ To regularize the practice that accounted for 20 percent of DRG reviewers by 1985, the Referral and Review Branch proposed establishing a "reserve corps" of pre-approved reviewers, drawn mostly from former study section members who could contribute expertise at review meetings, vote on recommendations, and assign priority scores. When the system was established under Douglass' successor, the system grew to include over 1,000 special reviewers by 1990, but a GAO report in that year indicated that further action to charter ad hoc panels still lay ahead.⁷⁴

Another Wyngaarden/Raub policy initiative resulted in the Florida Demonstration Project, a long-term exercise in "deregulating the grant relationship" to ascertain whether loosening restrictions on university grant administration would decrease costs and increase research opportunities.⁷⁵ Initial authorization came in an EPMC report on cost transfers between related projects at the same university. This report also warned that the intermingling of grant accounts would complicate the assessment of project budgets by initial reviewers, but the larger need for a "new paradigm" in research proved compelling.⁷⁶ In March 1986, a 2-year test run began, involving five Federal agencies, the Florida State University system, and the University of Miami. A streamlined award instrument common to all the participating agencies

was put in use to eliminate the need for many postaward approval actions.⁷⁷ Apart from conducting reviews on the small set of test applications, the Division played no part in this search for alternative mechanisms to the project grant system. Although the Florida Project shared the deregulatory intentions of the Reagan Administration's Grace Commission Report, it was never clear whether the administrative efficiencies achieved by the granting agencies resulted in improved fiscal management by grantee institutions. In a larger sense, the Demonstration Project illustrated the shift in NIH research management style from a project orientation to an environmental and behavioral orientation.⁷⁸

The Division became extensively involved in a third Wyngaarden/Raub era initiative, the Small Business Innovation Research (SBIR) Program. Mandated by PL 97-219 (July 22, 1982) and micro-managed by Congress, the SBIR program set aside \$5.6 million from the FY 1983 NIH appropriation for research and development proposals leading to commercial products or services.⁷⁹ Within 7 months of the program's onset in February 1983, the Division had set up special review procedures and reviewed 624 applications. It also generated the application kit and briefly operated the national information contact point for the small business community. Funding for the program was generous, but the quality of applications was poor, and approval rates were only half that for R01 applications.⁸⁰ RRB asked the Division to transfer SBIR review responsibility to the Institutes, claiming a second cycle would "almost certainly push our regular review operation beyond the breaking point."⁸¹ The option was not pursued, but the strain that SBIR review and other specialized application requirements placed on the Division would continue. The SBIR setaside for FY 1985 increased to \$40 million, and another grant venue appeared. The Academic Research Enhancement Award (AREA) program, a congressional setaside meant for support of small schools receiving little or no grant support, also became a mandated DRG review responsibility at this point.⁸²

Credit for coordinating proposed solutions to the Division's growing administrative burden, as well as the modernization effort begun in 1981, went to Deputy Director Schiaffino.⁸³ In 1981, he organized the acquisition of 31 IBM word processors for the Review Branch to prepare summary statements and to provide access to IMPAC.⁸⁴ SAB staff developed a computer file for summary statements, raising the expectation that Institute grants branches could soon retrieve their own summary statements without assistance from the study sections⁸⁵. In 1983, data capture capability was expanded to include codes identifying IRG meetings, and in the following year online access by Institutes for summary statement capture was established, and a program for computing priority scores was introduced. IMPAC became interactive that year with the addition of the RAID (Random Access for Institutes and Divisions) awards summary.⁸⁶ Council books were automated in 1985, and in 1986 the summary statement file and IRG agenda file were accessed online. These incremental advances made machine readable technology a reality.

All the foregoing would not have been possible without the dedication and professionalism of the men and women who occupy the key positions of Scientific Review Administrators (SRAs), formerly called Executive Secretaries and Grants Technical Assistants (GTAs) in the DRG peer review system. The SRAs are recruited from the Nation's universities and research laboratories with backgrounds and experience matching, as closely as possible, the review responsibilities of the study sections for which they are charged with managing. In this respect, they must ensure that the membership of the study section is composed of the best qualified scientists, and they also serve as the Federal officials in charge of study section meetings. To assist with the logistics of study section operations, the GTAs are invaluable assistants to both the SRAs and study section members. The combined expertise of the SRAs and the GTAs in managing the ever-expanding study section apparatus and review workloads,

including congressionally mandated initiatives, has earned for them the respect of members of the scientific community. They have served as major contributors to a system that has been looked upon as a model for the distribution and accountability, over the past 50 years, for the vast expenditures of public funds for biomedical and behavioral research. The continued acceptance, durability, and reliance on this system is a great tribute to these professionals who have served the Nation well and have been the mainstay of the essential role that the Division plays in the extramural programs of the NIH.

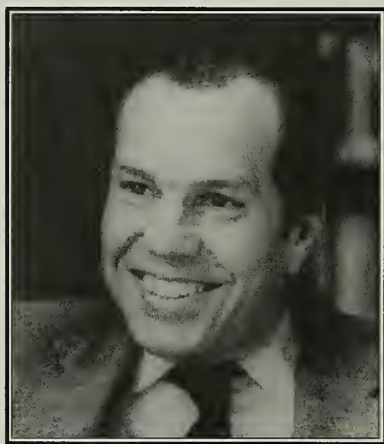
The Challenge of Complexity: The Review Process and Scientific Modernization, 1986-1995

It is no myth that the pressure for greater accountability for the use of Federal funds has (1) made the grants application process more burdensome for investigators, university administrators, and members of peer review groups; (2) contributed to additional uncertainty and insecurity in the careers of extramural scientists; (3) created impediments to the creativity and productivity of investigators. ...

NIH Director Dr. James B. Wyngaarden,
UCLA briefing on peer review,
November 5, 1987

*F*or the Division and NIH as well, a pattern of moderate growth set in during the 1980s, which eased the institutional strains of the previous decade and reinvigorated the scientific enterprise. To NIH Director James B. Wyngaarden, as to Dr. Fredrickson before him, the first priority of extramural policy was to continue "stabilization" — assuring an annual baseline of 5,000 new and renewal investigator-initiated projects and 10,000 trainees.¹ During 1980-1989, the basic research portion of the NIH budget, including intramural programs, grew from 52 percent to 63 percent, and funding for extramural awards increased from \$2.789 billion to \$3.530 billion, adjusted for inflation. Most of the increase went to Research Project Grants (RPGs), which absorbed 67 percent of the extramural budget in 1989, up from 57 percent in 1980. Within the RPG category, new grant mechanisms had a 22 percent budget share by 1989. In the same period, research

contracts fell from 16 percent to 11 percent, while Center and NRSA training grants each lost 3 percent.² Despite repeated efforts to expand investigator-initiated projects, Traditional Research Projects (R01s) dropped from 58 percent to 53 percent of all NIH awards, and the number of R01 awards declined from 4,263 to 3,636. To meet the flow of competing applications assigned to DRG, which rose from 18,768 to 24,314 over the decade,³ the Division increased its chartered study sections from 54 to 72 and its reviewer complement from 880 to 1,592. To make up for a decade of staffing deficiencies, the Division employment was allowed to expand from 392 to 469,⁴ after which the Clinton Administration's streamlining program imposed a ceiling of 422 for FY 1994.



54. Dr. James B. Wyngaarden, Director, NIH, 1982–1989.
Courtesy of the National Library of Medicine.

Peer review strengthening was essential to Wyngaarden's program, but the political legitimacy won for the system in the previous decade did not lead to higher award rates or a stronger consensus within the scientific community.⁵ The public discourse on peer review became increasingly problematic, for reasons which

remained unclear at the time. “We are in a period of adjustment,” Dr. Fredrickson suggested in 1982. Institutes and their extramural programs were awash with new biomedical knowledge, but Federal support was shifting in unpredictable ways.⁶ Managerial interest in scientific research was rising in Congress and the Executive Branch, but reforms to ensure accountability or to protect individual rights were generating red tape and research constraints at the operating level. Both sides of the Federal science partnership — the universities and the Federal health agencies — were showing a new willingness to dispense with peer evaluation of appropriated funds by “earmarking” special funding projects.⁷ Traditionally, peer review had served to ensure independent scientific assessment of grant-sponsored research. That traditional function was now weakening under activist congressional efforts to use peer review generally as a managerial tool for cost control, fraud monitoring, risk assessment, and other ancillary oversight roles in health legislation enacted after 1986.⁸ The new regulatory uses of peer review diverged significantly from the principles and practice of traditional grants peer review. In particular, direct and indirect participation by congressional committees in scientific management infringed upon the fundamental guarantee against Government control of research, which had been the settled consensus since Vannevar Bush and the debate over *Science—The Endless Frontier*.

Underlying these public uncertainties were strongly adverse trends, which persuaded a growing minority of leading biomedical scientists⁹ that peer review required major modifications to accommodate the new workload conditions. Public debate on peer review in the Wyngaarden era was thus bimodal.¹⁰ Policy assessments of NIH peer review invariably recapitulated the major findings of the Grants Peer Review Study Team (GPRST) survey that the best research was being funded, and an overwhelming majority of scientists endorsed the system. However, second-order effects — the validity of priority scores, resistance to innovative

proposals, and a decline in young awardees — were increasingly seen as problematic, and these served to focus the ongoing debate.

Peer review problems were ultimately chargeable to Federal funding levels, which lagged considerably behind the growth in research costs, the expanding pool of active biomedical investigators, and the investment requirements of the new molecular medicine. However, the policy debate accepted “cost management” as a given and focused instead on managerial issues — limiting work volume, contracting out support functions, and minimizing conflicts of interest.¹¹ During 1980-1989, the number of competing NIH project applications jumped dramatically, while the number awarded edged up from 4,785 to 5,385. By 1990, only 22.1 percent of approved R01 applications could be funded, and the backlog of approved, unfunded R01 applications had doubled, rising from 6,039 in 1980 to 11,244 in 1990.¹²

Apart from this critical shortfall in available funding, the surfeit of meritorious applications was aggravated by two secondary problems that arose within the review process. The first was the tendency of reviewers to refrain from recommending disapprovals for the sake of protecting the reputations of investigators. The second was the prolific growth in funded amended applications, which rose from 12.2 percent of R01 awards in 1980 to 38.2 percent in 1990. Following the 1979 decision authorizing the release of summary statements, review groups had developed a tutorial approach that encouraged applicants to resubmit different applications. Reapplications proliferated and effectively crowded out new applications from the paylines. By 1990, 84 percent of initial R01 applications remained unfunded.¹³ The Review Policy Committee saw priority-score drift as the bellwether issue. After median score levels eased below 200 in the fall of 1986, the Committee feared that the bunching of scores around the paylines would soon make it impossible to differentiate between meritorious applications on the basis of score alone.¹⁴ The alarm the Committee sounded in January 1987 heralded a cycle of peer review re-evaluation and renovation,

which continued through the ensuing decade.

Although larger parameters, such as adverse impacts on young investigators and emerging specialties, were visible in 1987, the peer review debate focused on managing the process and sustaining the quality of review. Dr. Wyngaarden brought home to the grantee community the seriousness of procedural reform during a public briefing at the University of California at Los Angeles on November 5, 1987.¹⁵ After previewing the new NIH Grant Appeals Board and a survey committee for peer review to be chaired by NHLBI Director Dr. Claude Lenfant, Wyngaarden refocused the policy debate on alleviating study section workloads, which had been excessive since the late 1970s. “One of the factors contributing to the workload of both grant applicant and the NIH Peer Review system,” he argued, was the excessive complexity and sheer bulk of the research grant application.

The excessive length of applications resulted largely from a vicious cycle in which study sections tended to engage in excessive scrutiny of applications for minor technical flaws and omissions that, in turn, created the perception among applicants that comprehensive, highly detailed documentation of all aspects of a proposal was required in order to increase the prospects of succeeding in the competition for funds.¹⁶

Corrective action would begin with a simplified and shortened application and proceed to longer award periods and the delegation of certain post-award functions to university grant offices. Once begun, it was unclear where “streamlining” the award process would end.

6.1

Rebuilding Organizational Strength, 1986-1991: The Division Regains Administrative Integrity Under Dr. Jerome G. Green

When Dr. Carl Douglass retired in May 1985, the Division had reached a plateau in personnel development. A large portion



55. Dr. Jerome G. Green and Staff, 1986. From left: John Wassell, Dr. Green, Barbara Williams, James Pike, Terry Little, Dr. Luecke, and Joyce Lopez.

of the senior staff, including Acting Director Dr. S. Stephen Schiaffano, was approaching retirement age.¹⁷ The branch structure had been modified in the 1970s to reflect the atrophy of key functions, such as training grants and research evaluation, but not to project Division initiatives or new functions. Taking advantage of the retirement of 26 staff during 1986-1987,¹⁸ the incoming Director, Dr. Jerome G. Green, installed a new management team and reoriented the Division to accommodate the heightened workloads and electronic data transfer technology that was redefining Division operations.

A cardiologist and Commissioned Corps officer who had been prominent in extramural affairs since 1966, Dr. Green brought to the Division a core management group from the

categorical Institutes, a reputation as a forceful advocate in extramural policy debates, and a strong disposition towards “well-designed experiments to improve peer review.”¹⁹ Soon after his appointment on January 31, 1986, Dr. Green convened the Division’s first annual staff meeting since 1970 to initiate the transition, and he also explored the possibility of reconstituting DRG as a Center and its two principal branches as Divisions.²⁰ Reorganization began in December 1987, when the Referral and Review Branch (RRB) was realigned. The Manpower Review Section, a vestige of the fellowship review function, which had resided in Career Development Review Branch, was inactivated, and the six review sections began adding support personnel, particularly “floater” executive secretaries whose main function was special reviews.²¹ In January 1988, the Administrative Branch was replaced by the Office of Administrative Management, a streamlined structure facilitating personnel services and operational specialization.²²

A similar metamorphosis turned the Statistics and Analysis Branch into the Information Systems Branch (ISB) in the spring of 1988. Focused on “integrity of systems” and “establishing a proponent organization for new systems development,” the new branch had five sections, two of which were tasked with providing quality assurance for CRISP and IMPAC data and articulating NIH/PHS needs for award and post-award information.²³ Mindful of the interdependence between ISB and the Division of Computer Research and Technology, Dr. Green consulted with NIH Deputy Director William Raub before appointing Nicholas Suszynski as ISB Chief and as Associate DRG Director for Statistics and Analysis.²⁴ In the Office of the Director, Suszynski joined Referral and Review Branch Chief Dr. Mischa E. Friedman, Associate Director for Referral and Review, and Green’s appointee as Deputy Director, Dr. Donald H. Luecke, as the Division’s chief operating officers. A Commissioned Corps physician and clinical microbiologist, Dr. Luecke had responsibility for “overall scientific management and coordination” of Division activities.²⁵

A strong infusion of new staff accompanied these organizational changes. During 1987-1989, the employee newsletter counted 224 arriving personnel and 188 departures — roughly half the Division's staff in each case. A wave of hiring began in 1986 and peaked in 1991, when DRG strength stood at 469.²⁶ Minorities and women predominated among the new hires, and the resulting staff composition significantly advanced the Division's standing affirmative action program. Of 174 new hires between 1986 and 1988, 49 (28.2 percent) were African-Americans, and 116 (66.7 percent) were women.²⁷ One new expansion facility was the Frederick Document Preparation Center, an RRB satellite office located 35 miles northwest of Bethesda. Opened with a staff of six in June 1989, the Frederick Center provided support services for electronic transmittal of summary statements and review correspondence.²⁸

Another innovation was the formation of the DRG Advisory Committee in the same year. Consisting of seven senior administrators and researchers from academic settings, the Committee provides technical and scientific advice to NIH and the Director, DRG, in the areas of review policy and procedures and information systems management and development. Chaired until 1992 by Professor Paul Meier of the University of Chicago, the Committee meets twice annually and provides a high-level forum for DRG policy review.²⁹ In this peer review of peer review, the Committee meetings enable non-Federal scientists to comment critically on current DRG plans and practices.

6.2

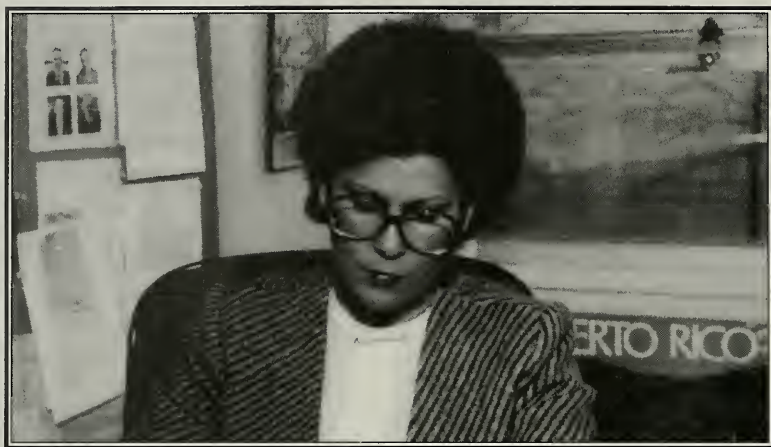
Reshaping the Peer Review Process: Innovations, Policy Assessments, and the Changing Nature of Peer Review, 1986-1992

The peer review problems that preoccupied the late 1980s resonated with earlier controversies over workload management, percentiling, and reviewer fatigue. But while the menu of remedy

options compiled by the various survey committees was more complex and novel, the internal debate was less susceptible to compromise and consensus. In the final analysis, the improvements achieved had less effect on the fundamental problem, which was now seen as the sheer weight of administrative burden. What had previously seemed to be the root of the problem — too many investigators chasing too few research dollars — remained true, except that most observers of the peer review process now accepted it as permanent and interwove it with their prospective solutions.

Dr. Wyngaarden's approach to the problems of peer review was conditioned by Reagan Administration science policy, which strongly emphasized deregulation, privatization, and targeted incentives for technological objectives.³⁰ To alleviate the regulatory burden on grantee institutions, NIH proposed to "liberalize" post-award processing by allowing university grant offices to carry over unobligated balances, to transfer costs between projects, and to conduct other decentralized administrative options, which the Division had field tested in the Boston Pilot exercise of 1963-1964. Following the November 1984 meeting of the Advisory Committee of the NIH Director, OD/NIH set new goals for extramural awards policy. To extend average project length beyond 3 years, NIH put into operation the FIRST Award (R 29), which gave new investigators 5 years of support, and the MERIT Award, which gave senior scientists up to 10 years without the need for detailed application for continued support.³¹ Before these mechanisms became operational, the median priority score for the October 1986 round of review meetings registered below 200 for the first time, and the Review Policy Committee asked the Director to impose a priority score normalization convention.³²

In August 1987, an EPMC Working Group on the Movement of Priority Scores recommended a percentile ranking system to solve the immediate problem. Wyngaarden put the system to use with the October 1988 Council round, and scores quickly returned to a more desirable distribution.³³ The complex of



56. Dr. Antonia C. Novello, Executive Secretary, General Medicine B Study Section, 1981–1986; Surgeon General, U.S. Public Health Service, 1990–1993.

factors driving the adverse movement of priority scores was not entirely clear to NIH management. The Working Group also pointed to a structural problem that later panels would have to address. The peer review system, originally developed “to distinguish between those applications that deserve funding and those that do not,” was now asked “to make discriminations among applications of similarly high merit, all of which deserve funding.”³⁴ As the NIH funding rate dropped from about 37 percent in 1988 to about 24 percent in 1990, research administrators feared that young investigators and smaller research programs were being “squeezed out of the system,” while investigators with proven success enjoyed a “selective enrichment” of grant funds.³⁵

This longer-term problem was assigned to Dr. Lenfant’s Peer Review Committee in July 1987. The committee spent 20 months reviewing an enormous volume of commentaries from the scientific community and recommending experimental trials of suggested procedural improvements that appeared to have promise. Management issues were left to various other survey groups, and discussions were discursive in nature. In

recommending against limiting submissions of amended applications, the final report overrode a longstanding DRG interest.³⁶ The committee also decided against experimenting with pre-review methods for identifying innovative research, but it encouraged the development of electronic media for the submission of grant applications and for referral and review processing.³⁷

Much of the Division's input was focused on an adjunct survey group charged with looking at DRG practices and procedures — the Receipt, Referral, and Review Committee. This "3R-Committee" consisted of working staff from DRG and seven of the Institutes, and it was chaired by Drs. Henry C. Roscoe (NHLBI) and John Dalton (NINDS). DRG noted that the new grant mechanisms, as well as proposals responding to Requests for Applications (RFAs), had a "serious detrimental effect on the processing of regular applications," which could be remedied only through significant staff augmentations until such time as paper submissions were completely replaced by electronic submissions.³⁸ On the review side, the committee examined but declined to adopt a triage procedure for DRG and other major departures from traditional practice, including a forthright disavowal of the tutorial functions of study sections, which was widely recognized by survey participants as a major cause of overlong applications and amended applications. The Division also contracted an independent assessment of its Project Control operation, which recommended reconfiguring the unit as an assembly line for more intense production.³⁹ Few of the recommendations were adopted, but a clear dichotomy was emerging between working level groups, which sought relief from administrative burdens borne by DRG, and program management groups in the Office of the Director, NIH, which construed administrative burdens as a systemic trans-NIH problem requiring innovations in the grantee community.

The Division also took initiatives to meet mounting workloads in review. Most study section expansion occurred

through the addition of ad hoc reviewers to existing study sections. In June 1987, DRG regularized this process by creating a centralized NIH Reviewers Reserve of former study section members and other senior academic scientists who would be called upon to attend IRG meetings and enfranchised to vote on applications as needed.⁴⁰ Although DRG representatives regularly participated in extramural policy forums, a critical disconnect was developing with DRG executive secretaries, whose advice was seldom sought when the review process was under examination. In the summer of 1988, the Lenfant Committee was succeeded by a panel of outside advisors chaired by Dr. Alfred Fishman of the University of Pennsylvania. The report of this Ad Hoc Panel, *Sustaining the Quality of Peer Review*, served mostly to elaborate the manifold difficulties faced by reviewers and executive secretaries. Despite its sympathetic point of view, the report was criticized in the DRG Advisory Committee meeting for understating the disincentives to consultant service.⁴¹ In a lengthy rebuttal, RRB section chiefs and Executive Secretaries objected that the panel's suggestions would "codify Study Section operations and procedures" and compromise the flexibility needed for successful review administration.⁴²

Two additional peer review surveys appeared in 1991, and these seemed to bring study section working levels closer to administrative management. Within the Division, Dr. Green formed the Study Section Think Tank to explore new referral patterns and new models of study section organization. The Think Tank revisited the Ad Hoc Panel's 33 recommendations, adopted nine criteria for determining the strengths and weaknesses of various study section organizations, and then developed models for potential new IRGs. These recommendations were presented to the DRG Advisory Committee, but were not implemented, and no changes in study section configuration resulted.⁴³

Soon after Dr. Bernadine Healy became NIH Director on April 9, 1991, her office initiated a new comprehensive extramural

survey, this time as part of Dr. Healy's package of strategic planning issues. Co-chaired by the DRG Director, the panel focused primarily on current operating problems of DRG study sections and their immediate remedies. Discussants attempted to limit the grants appeals process and to standardize application review procedures at the Council level. They were among the first to formally acknowledge a problem with the review of innovative proposals.⁴⁴ The panel's August 29, 1991, report extensively catalogued DRG process innovations, such as a prototype voting machine and Special Emphasis Panels for ad hoc review, as well as DRG operational problems, such as investigators who declined to serve (declinations) and the tripling of amended applications since 1980.⁴⁵ The DRG focus was rigorous and thoroughgoing. Following acceptance of the panel report in September, Dr. Healy convened a second panel under the same rubric to examine "systemic" as opposed to specific review problems.⁴⁶

6.3

Entering the Interactive Era: The Information Systems Branch and Computerization in the Review Process, 1986 – 1994

Although the Division coped with rising workloads in the 1980s primarily by expanding the review structure, the various assessment panels convened between 1986 and 1991 relied heavily on the next stage of computer automation — electronic application processing — as the long-term solution to the workload problem.⁴⁷ The Division had begun preparations to cross this vital threshold in 1985, when Acting Director Schiaffino procured the first personal computer workstations and initiated the Application Transfer Team (ATT) Planning Study. At stake in the transition to electronic application processing was a significant reduction in the "100-plus million pages of applications and summary statements," which the Division printed annually.⁴⁸ The

full implications were spelled out in a survey completed in February 1988. Applications could be distributed via a bulletin board or received as PC diskettes for direct inputting into an enhanced IMPAC database, which would capture and process the entire content. Study teams were set up to assess basic system requirements for optical scanning of hard copy applications, an early extramural bulletin board, and for the transformation of IMPAC into an advanced data management system.⁴⁹

Relative to other Federal agencies, the Division entered the race for full computerization with significant disadvantages. Much of the professional review staff was not computer literate, and a major portion of the programming resource belonged to the Division of Computer Research and Training (DCRT). Of the two principal undertakings — “migrating” IMPAC to a relational database and developing a system for electronic grant submission — the first alone was expected to “mortgage our resources severely.”⁵⁰ The second was initially entrusted to an in-house collaboration of Dr. John Mathis, Pathobiochemistry Executive Secretary, and Dr. Richard Feldman, a DCRT computer specialist. After successfully demonstrating an automated referral program prototype to the Westwood staff in October 1987, Mathis was designated the DRG focal point for developing EGAD — the Electronic Grant Application Development.⁵¹ While in-house ISB staff were performing exploratory field studies with PC versions of the EGAD, Mathis and Feldman planned the evaluation of a model electronic application system, demonstrating the costs and time requirements of “migration” from a paper basis to an electronic basis.⁵² To establish an automated operating environment, ISB in April 1988 undertook to install 100 PC workstations in 24 months and to bring online a Local Area Network.⁵³

In mid-1989, DRG initiated a decade-long Modernization Project to convert IMPAC and CRISP to a single database management system, IMPAC II, capable of processing

applications received across three platforms: mainframes, LANs, and PCs. A MITRE Corporation survey, verified by an in-house advisory committee, proposed acquisition of ORACLE relational database capability, but it also warned that “there is no general-purpose DBMS(Database Relational Management System) that can meet all requirements for both IMPAC and CRISP.”⁵⁴ Mathis and the contractor proceeded to develop EGAD prototype software intended to run on either MacIntosh or DOS PCs. Although a demonstration package was ready for the DRG Advisory Committee in April 1991, the Automated Grant Application System (AGAS) software required extensive debugging by the ISB staff and could not be readied for usability trials.⁵⁵ Dr. Green became convinced that immediate field testing was premature. The EGAD concept was changed in the spring of 1992 to give AGAS until 1996 to reach extramural users. The advent of a fully mature system was put off until about the year 2000.⁵⁶ Subsequently, a strategic decision to turn software development over to commercial organizations left ISB in a stronger position to focus on database migration and application processing.⁵⁷

6.4

Basic Research for AIDS: A Window on Extramural Change, 1986–1991

One major impetus driving the initial phase of database modernization was the AIDS Research, Information, and Care Act of 1987 (PL100-607), which required PHS to process AIDS awards within 6 months of public solicitation of applications. Galvanized by projections that the expected U.S. death toll would reach 100,000 by 1991, PHS persuaded Congress to authorize a comprehensive Federal program of blood testing and public education — a program that significantly lacked new funding for research⁵⁸ To shorten the existing 9-month award cycle, the



57. NIH AIDS forum, 1987. From left: Dr. William F. Raub, NIH Deputy Director; NIH Director; Dr. James Wyngaarden; Vice President George Bush; NIAID Director Dr. Anthony S. Fauci. Courtesy of the Office of the Secretary, DHHS.

Division established a special channel for R01 and R29 applications on AIDS with special receipt dates. A labor-intensive manual referral system, and submission in 32 instead of 6 copies to eliminate in-house duplication were also involved. The expedited AIDS program — Accelerated Solicitations to Award Process (ASAP) — also involved modifying IMPAC to identify AIDS grants and contract awards and to yield data on funded projects classified by 16 functional categories.⁵⁹ Expecting a review load of about 800 applications during 1988, the Referral and Review Branch added five new AIDS study sections.⁶⁰ Two additional review groups formed out of subcommittees. The full complement was reached in 1990, when charters were issued for seven AIDS study sections.

Congressional funding for AIDS, the largest growth sector in the NIH budget during the Wyngaarden era, brought new

energy and also new workload problems to the Division. During FY 1986–1990, NIH AIDS obligations rose from \$63.7 million to \$740.5 million, while DRG obligations increased from \$18.9 million to \$31.9 million, and the cost of review, the Scientific Review and Evaluation Award Expenditures, jumped from \$6.7 million to \$9.9 million.⁶¹ Moreover, on the recommendation of a Presidential Commission that OMB cease micro-managing AIDS research, Congress lifted the hiring freeze and that allowed DRG to add 15 new FTEs. The FY 1989 budget also dispensed with an upper limit on the number of grants to be funded.⁶² Coming after 7 years of AIDS research development, these measures reduced reliance on contracting out portions of the Executive Secretary function, a practice developed within Institute review panels. Work unit assignments, particularly for program-project grants, required so many ad hoc reviewers that high workloads became continuous throughout the year. “Peak-valley periods in DRG no longer exist to any considerable extent,” the EPMC observed in January 1987. Left to continue, the trend could degrade review quality and raise more concerns about the validity of the grant exercise.⁶³

In general, the expansion of extramural grant support for AIDS research in 1988 rectified an earlier overemphasis on the contract mechanisms. It also reduced the reprogramming of funds from other health areas and allowed the total Federal expenditure for AIDS research to rise to the \$1-billion level by 1990.⁶⁴ Notable quality improvements in the 1,000 AIDS applications received in 1990 — about 37 percent scored between 100 and 200 — reflected careful cultivation of investigator interest by program staff and study section workshops in areas such as virology, immunology, and molecular biology. The larger effect was to provide a pipeline of background research studies and to create opportunities for related developments in molecular medicine, as the fundamental problems of AIDS transmission, pathogenesis, and immune response are addressed by investigators.⁶⁵

6.5

Renewal and Renovation: The Division and the Modernization Programs of Drs. Bernadine Healy and Harold Varmus, 1991-1995

After 1986, a pattern of incremental change and study section expansion had brought the Division into constructive engagement with the public controversies that were reworking the fundamental relationship between science and the Federal Government. The retirement of Dr. Wyngaarden in July 1989 removed a key personal link with traditional constructs of peer review and NIH leadership. The last NIH Director drawn from the Commissioned Corps, Dr. Wyngaarden was a product of the Shannon expansion who had served on study sections and submitted grant proposals. He was followed by the first female Director, Dr. Bernadine Healy, an energetic critical care clinician who dedicated her administration to revitalizing the "public factors" of the NIH mission.⁶⁶

A political appointee who had last served in the White House Office of Science and Technology, Dr. Healy brought to NIH important access in Congress. Shortly after confirmation on March 21, 1991, Dr. Healy prevailed on Representative William B. Natcher (D-Kentucky) to commit funding for the Consolidated Office Building, planned since 1978 as the next home for the extramural programs.⁶⁷ The design was finalized in February 1992, and construction officially began on September 29 of that year. Opened in 1995, the Natcher Building's first stage was emblematic of Dr. Healy's vigorous reassertion of biomedical research imperatives. Likewise, her strong support of the National Center for Human Genome Research and her recruitment of its second director, Dr. Francis S. Collins, signaled a more aggressive approach to scientific opportunities. Before congressional committees, she was a forceful advocate for high research budgets, particularly for traditional projects. During her brief tenure (1991-

1993), the NIH budget went from \$7.6 billion in 1990 to \$10.4 billion in 1993, and NIH employment increased to 17,405, after a full decade at the 15,000 level.⁶⁸

The development of a strategic plan was Dr. Healy's chosen instrument to influence Congress and to bring unified, corporate direction to the NIH Institutes, which in 1992 were joined by three research institutes from the Alcohol, Drug Abuse, and Mental Health Administration (ADAMHA).⁶⁹ Additional structural stresses on the review system came from the expansion of chartered DRG initial review groups from 90 to 101 and of authorized members from 1,848 to 2,506 during 1985-1991. Cross-disciplinary applications generated by new scientific fields grew in volume until 27 percent of the workload in FY 1990 required ad hoc review. The profusion of unchartered ad hoc review panels — some 1,135 in 1990 — alarmed the General Accounting Office (GAO). This resulted in DRG directives to charter ad hoc bodies as Special Emphasis Panels and an RPC recommendation to reconsider contracting out certain executive secretary functions to consultants.⁷⁰ Other changes pointed to a stronger emphasis on review management and a willingness to depart from conventional usages in the interests of administrative efficiency. In February 1991, the EPMC voted to substitute the title, Scientific Review Administrator (SRA) for executive secretary, on the grounds that the traditional title connoted "a work function that has little management or science responsibilities."⁷¹

In broad terms, the Strategic Plan approached problems of complexity in the review process by strengthening centralizing functions. Measures proposed in the 1993 final version included establishing a central peer review advisory group to revise procedures and recommend new directions for review groups, special incentives for innovative proposals, and the appointment of more women and minorities to IRGs.⁷² Preferring to see opportunity where many respondents saw threats to peer review integrity, Dr. Healy required study sections to evaluate the "high

risk/high payoff” aspects of project proposals by study sections, and she also reestablished an informal rule that candidate lists for study section service must always contain at least one female candidate.⁷³ Her conviction that innovative investigators were disadvantaged in the review process was an important departure from prevailing official belief, and it opened the door to more extensive consideration of peer review problems as viewed by grantees and consultants.

After June 30, 1993, when Dr. Healy tendered her resignation as part of the change in presidential administrations, the renovation process continued. Spurred on by the Clinton Administration’s Executive Order 12838, which required NIH to abolish one-third of its unchartered review groups, the EPMC organized a further probe of peer review options under Dr. Constance W. Atwell. The preliminary report of the Atwell



58. Physiological Chemistry Study Section meeting, 1988.

Dr. Stanley Burrous, Executive Secretary (seated in rear on left); Dr. Janet Stein, Chair.

Committee reflected a new consensus about the direction of procedural innovations, starting with the assumption that “summary statements should not be primarily tutorial in nature.” The review process could be simplified and streamlined by removing receipt deadlines, eliminating amended applications, and restricting intake through triage or “streamlined process,” as it later became known. Also during 1993, the use of triage for review of applications received in response to RFAs by institute review groups was evaluated. The findings indicated little likelihood that a highly competitive application would be wrongly disqualified, and a decision was made to extend the test of triage from the Institute panels to DRG Study Sections.⁷⁴

The pattern of these prospective changes also reflected the thinking of the new NIH Director, Dr. Harold Varmus, Nobelist and professor of molecular virology at the University of California at San Francisco, who was confirmed by the Senate Labor and Human Resources Committee on November 3, 1993. A former member of DRG’s Virology Study Section and holder of a Career Development Award, Dr. Varmus was strongly committed to fundamental research and peer review renovation. The new Director backed the triage experiment, electronic filing of grant applications, and special encouragement for identifying the clinical relevance of basic research projects. Fundamentally opposed to the bureaucratic culture that Dr. Healy promoted during her tenure, Dr. Varmus’ belief that science thrives in a climate of diversity signalled the onset of a more thoroughgoing cycle of institutional change.⁷⁵

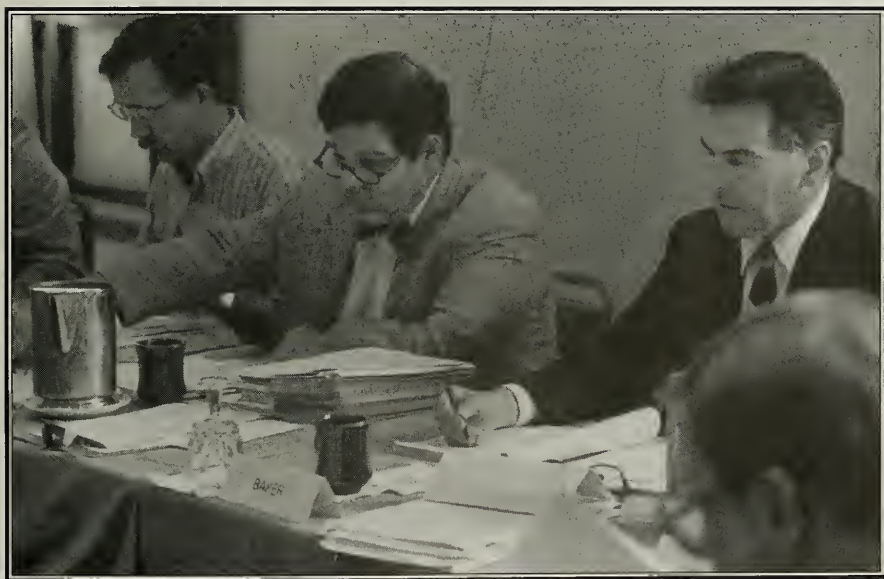
Responding to the new direction in peer review policy, the Division conducted experimental trials of the streamlined process at the February and June 1994 rounds of review meetings. Selected study sections were asked to identify approximately half the referred applications as noncompetitive. Only competitive applications were scored, and applicants were furnished with traditional consensus summary statements containing the largely

unedited comments of reviewers. Study section members reacted positively in both trials. A third trial involving 52 study sections in October 1994 also generated positive reactions for another innovative program, expedited production of summary statements. Reviewers' comments on noncompetitive applications and those in the lowest third of scored applications were sent to the applicant unedited. Applicants generally affirmed that raw critiques were preferable to synthesized critiques representing consensus views, and the study sections reported less work time and more responsive feedback.⁷⁶

Streamlining efforts gained further momentum in 1994 when PHS designated the NIH extramural program as a "Reinvention Laboratory" or demonstration area for the Clinton Administration's program of downsizing Federal agencies. These new constraints required DRG to relinquish 10 FTEs per year or 50 FTEs by October 1999. Projecting shrinkage among grants technical assistants (GTAs), the Referral and Review Branch decided to establish GTA assignment at the review section level, thereby modifying significantly the traditional relationship of GTAs to particular study sections.⁷⁷ To meet the required one-third reduction in study section charters, the Referral and Review Branch kept the 84 study sections intact while transferring the charters to 19 composite review groups and 6 special emphasis panels, all clustered in 6 review sections for administrative support. Apart from eliminating 59 charters, the RRB reorganization regularized ad hoc reviews by bringing them into chartered special emphasis panels, and it also facilitated transferring members between panels to meet varying workload conditions.⁷⁸

Within the Information Systems Branch, streamlining efforts included an implementation contract for the IMPAC/CRISP Migration Project, awarded in June 1994, and a pilot exercise testing the Limited Electronic Submission Status (LESS) program, in which face page data are extracted and entered directly into IMPAC. In the Electronic Grant Application

Development (EGAD) Project, preliminary testing of the module developed to receive electronic submissions was scheduled for October 1994.⁷⁹ The NIH also introduced “Just-in-Time” processing for support documentation. Under this system, detailed budget information is not required of an awardee until the application is in a “likely to be funded” status.⁸⁰ The net effect of these initiatives was to allow the Division to take on greater workloads despite constantly decreasing staff levels. With the new efficiencies, the Division continues its commitment to sustain the quality of review and to keep the trust of the biomedical community in the peer review system.



59. Fellowship review session, Biomedical Sciences Review Section.
Dr. Charles Baker, (right), Executive Secretary.

EPILOGUE

Coming Full Cycle: The Division and Peer Review at the Threshold of Molecular Medicine

Using democratic methods and continuously exploring means for improving administrative procedures and policies, the Division has fostered an extraordinary degree of scientific freedom. This brilliant administrative achievement is of immeasurable value to public health.

Lasker Award citation, 1953, presented
Ernest Allen for the Division of
Research Grants

*A*s DRG prepares to enter its golden anniversary year, the tempo of change in the extramural system has quickened, and the parameters of institutional change have steadily widened. The rising action began in November 1994 when Dr. Green announced at the Advisory Committee meeting that the Division would relocate to the Rockledge II building, approximately 2.9 miles from the NIH reservation, and that he would retire and relinquish the post of Director effective June 1, 1995. Congressional elections earlier in November produced a tectonic shift in the policy world which ended synergistic relationships, which NIH had developed with Democratic members since 1974. The Republican 104th Congress, which organized in January 1995, moved quickly to enact budgetary guidelines, projecting a 29 percent net funding decrease for NIH through the year 2000 and a drop in funded new grants from 6,500 to 4,000 during FY 1996 alone.¹

The impact of these adverse and unsettling developments was greatly aggravated by a re-evaluation of the Division's administrative functions initiated by the Office of the Director, NIH, in December 1994. A 12-member committee, chaired by Acting NIGMS Director Dr. Marvin Cassman, conducted a 4-month review of DRG operations from a "client-service" viewpoint and recommended a fundamental shift in responsibilities to the Office of the Director, NIH, as well as reorientation of review groups to achieve broader scientific expertise. Concerned that the Division's long-standing autonomy had generated a psychology of "isolation" that impeded Institute programs, the Committee suggested that study sections be made more responsive to program needs, that certain study sections migrate to Institute control, and that the Division itself be placed under the administrative supervision of the Deputy Director for Extramural Research (DDER). Once again, as in 1968, the question of abolishing the Division was actively considered. The measure failed to carry by a single vote and may be revisited by a new Peer Review Oversight Group (PROG), which has been established to coordinate and evaluate all NIH peer review activities. The Committee also extensively criticized the slow progress of database migration to a fully electronic record system. It recommended abolishing the Information Systems Branch and transferring key components to DDER.² Within weeks of the public presentation of the Report's findings on May 4, 1995, implementation began, and ISB was placed under control of DDER.

The pace of these changes has drawn the Division away from day-to-day administrative realities and forced its leadership to reconsider the services DRG delivers to the research community and the role DRG plays in extramural peer review. How the DRG mission will be reconfigured depends upon two institutional variables that have sustained the Division for 50 years: the pluralism of NIH as a corporate entity and the consensual nature of scientific decision-making. The decentralized system of Federal biomedical research established by Thomas Parran, Rolla Dyer, C.J. Van Slyke, and

Ernest Allen has thrived over the years by granting investigators direct control over their research and by relying on the scientific community at large for definitive advice concerning research policy issues and the manner of their implementation. The Cassman recommendations represent important voices within corporate NIH and the scientific community, but not until extensive surveys reveal a substantial consensus in both bodies will the full extent of the pending changes be known.

Whether the Division emerges intact at the end of the process may matter less than whether NIH can find an appropriate organizational home for "centralized" extramural activities traditionally conducted by DRG, and whether extramural administrators adopt the proper mix of operating procedures for peer review in the next scientific era. Dr. Allen and his predecessor, Dr. David Price, were quite willing to shift the grants system to a new administrative venue, such as the Office of the Surgeon General, as long as the result was better service for investigators and better functioning for peer review. On the other hand, the latest GAO report on peer review gave the NIH process high marks for maintaining an administrative structure that could ensure uniform reviewing criteria and IRG behavior.³ Credit is due the Division and the centralized activities it has supported in current form since 1976 and to the high standards of review maintained by its study sections. Advocates of placing these functions in DDER should consider the critical arguments raised by the Division and DHEW at the Belmont House conference in 1968 — that administrative oversight functions dilute the authority of executive bodies and detract from the essential exercise of policy management. The Division's entire legacy can be summed up in Eugene Confrey's contention at the conference that "excellence demands a center."

For the Cassman Committee's recommendations on peer review reform to come into effect, a much larger exercise in consensus-building will have to ensue. The Division's viewpoint on dual review and the separation of program and review functions, while traditional,



60. Rockledge II, seat of Division operations as of May 1995.

will have to be melded into the consensual product in order to protect the interests of investigator-initiated research, which accounts for the majority of awards and remains the basic point of reference in the peer review system. Institute review panels, where program interests are considered along with scientific merit, accounted for 32.8 percent of NIH awards in 1994, double their 1985 share but still the minor portion of all NIH awards. For these panels to serve as the model for fundamental research, which is not mission-related, would require extensive polling of the grantee community and considerable adjustment on the part of grantees already vested in the system. The process orientation of study section development prior to 1995 represents a historic compromise between political and administrative constraints imposed from without, on the one hand, and on the other the conflicting needs of the biomedical community to support both institutional continuity and the emergence of new scientific fields. This expedient and never satisfactory compromise has nonetheless provided an essential institutional framework for quality and technical merit assurance. For the success of peer review to continue, re-engineering this relationship must also renew the ties that bind together the biomedical research community.

The Division's main historical role has been as facilitator and guarantor of peer review. The excellence of this service over the long term has been amply confirmed by a long series of extramural surveys beginning with the Wooldridge Committee Report in 1965. One rough measure of the Division's success in the provision of review services is the phenomenal growth, in cumulative terms, of projects, investigators, and awards tracked on the IMPAC database. For the period 1946-1994, IMPAC lists 109,474 principal investigators, 275,195 competing awards worth \$26.3 billion, and 786,444 awards of all types, worth \$121.7 billion.⁴ The sheer volume of the NIH extramural enterprise, the majority of which has been DRG's historical responsibility, attests to the continuing viability of the Division's institutional role in processing grant applications, stimulating basic research, managing peer review, and sustaining its high quality.

The Division and its peer review activities have long been a vital force in the evolution of the culture,⁵ which distinguishes NIH from other Federal science agencies and which continues to set the parameters of extramural policymaking. Dual review, the separation of program functions from review, site visits and special review, consensual agreement by general conferences — these are all practices derived from DRG operational precedents. The Division has also served NIH a generating nexus of institutional components, beginning with the National Institute of General Medical Sciences and including the Grants Associates Program, the Policy and Procedure Office, and the Office of Protection from Research Risks. In an era of increasing complexity of funding mechanisms, grantee interests, and scientific advances, the institutional culture that the Division has created in a half-century of interaction with the scientific community could well provide an essential locus of extramural activity in the next biomedical epoch.

Prologue Endnotes

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3. Donald S. Fredrickson, "Biomedical Science and the Culture Warp," in W.N. Kelley and E. Rubin, eds., *Emerging Policies for Biomedical Research* (Washington, DC: Association of Academic Health Centers, 1993).

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6. Joseph W. Mountin and Clifford H. Greve "The Role of Grants-In-Aid in Financing Public Health Programs," *Public Health Bulletin*, 303 (Washington, DC: GPO, 1949), 3-4.

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10. *Ibid.*, 132.

11. Shryock, *American Medical Research*, 43-44; Victoria A. Harden, *Inventing the NIH: Federal Biomedical Research Policy, 1887-1937* (Baltimore: Johns Hopkins University Press, 1986), 12; Charles Zaid, "Preliminary Inventory of the Records of the National Board of Health," National Archives and Records Service, 1962. The National Health Board is considered the first Federal involvement in biomedicine. See G. Burroughs Mider, "The Federal Impact on Biomedical Research," in John Z. Bowers and Elizabeth F. Purcell, *Adventures in American Medicine: Essays at the Bicentennial* (New York: Josiah Macy Foundation, 1976) Vol. II, 814-16.

12. Dupree, *Science in the Federal Government*, 215-19; Joseph W. Mountain, Emily K. Hankla, and Georgie B. Druzina, "Ten Years of Federal Grants-in-Aid for Public Health, 1936-1946," *Public Health Bulletin*, 300 (Washington, DC: GPO, 1949): 48-49; Duffy, *The Sanitarians*, 194-97.

13. Furman, *Profile of the Public Health Service*, 220-248; Harden, *Inventing the NIH*, 17-19. The Hygienic Laboratory Advisory Board was the forerunner of the National Advisory Health Council (NAHC).

14. Harden, *Inventing the NIH*, 36-39.

15. Nathan Reingold, "National Science Policy in a Private Foundation: the Carnegie Institution of Washington," in Alexandra Oleson and John Voss, eds., *The Organization of Knowledge in Modern America, 1860-1920* (Baltimore: Johns Hopkins University Press, 1979), 318-24; Shryock, *American Medical Research*, 88-95, 108-10.

16. Dupree, *Science in the Federal Government*, 302-20; Shryock, *American Medical Research*, 262-63.

17. *A History of the National Research Council, 1914-1933*, NRC Reprint and Circular Series, No. 106 (Washington, DC: NRC, 1933) 7-9, 29-30; Reingold, "National Science Policy," 324-25.

18. Stanley Coben, "American Foundations as Patrons of Science: The Commitment to Individual Research," in Nathan Reingold, ed., *The Sciences in the American Context: New Perspectives* (Washington, DC: Smithsonian Institution Press, 1977), 232-33; Robert E. Kohler, *Partners in Science: Foundations and Natural Scientists, 1900-1945* (Chicago: University of Chicago Press, 1991), 71-84, 405.

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29. Larry Owens, "MIT and the Federal Angel: Academic R & D before World War II," *ISIS* (1990) 81: 211, note 72; Carrol Pursell, "Science Advances in World War II," 364. For the key function of "farming out" research to the private sector, see R. H. Heindel, *The Integration of Federal and Non-Federal Research As A War Problem* (Washington, DC: National Resources Planning Board, 1942), 58-63.

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31. Minutes, CMR meeting, 8/7/41, Annex 2, in OSRD Subject Files, box 1, entry 162; Administrative Order 2, 7/29/42, 3-5, in OSRD Subject File, Organization/OSRD-"Memo on OSRD Operations," box 64, entry 13, RG 227; Stewart, *Organizing Scientific Research for War*, 44-48, 57-64, 78-83. For the view that Bush derived this organizational pattern from the relationship between the National Academy of Sciences and the National Research Council, see Reingold, "Vannevar Bush's New Deal for Research; or, The Triumph of the Old Order," in Reingold, *Science, American Style* (New Brunswick: NJ: Rutgers University Press, 1991), 294-95.

32. Transcript of minutes, CMR meeting, 8/7/41, 3, 14-15, box 1, entry 162, RG 227.

33. Shryock, *American Medical Research*, 289-91; letter, Bush to Jewett, 1/30/42, OSRD Advisory Council file, box 64, entry 13, RG 227.

34. Stewart, *Organizing Scientific Research For War*, 102-3. The CMR also approved 92 additional proposals not reviewed by NRC. Minutes, CMR meeting, 9/4/41, box 1, entry 162, RG 227.

35. Memorandum, Bush to NDRC Members, 5/24/44, NDRC/OSRD Organization file, folder "Definition of Functions", box 64, entry 13, RG 227; Stewart, *Organizing Scientific Research For War*, 101-2, 111-12, 194-95.

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38. Minutes, OSRD Advisory Council meeting, 1/6/44, box 64, entry 13; minutes, CMR meetings, 8/3/44, 8/31/44, and 9/21/44, box 8, entry 162, RG 227. Quotation is from letter, Bush to Rear Admiral J. Furer, 8/8/44, box 8, entry 162.

39. Minutes, CMR meeting, 8/17/44, attachment, p. 4, box 8, entry 162, RG 227. In October, Bush agreed to keep OSRD intact until the end of the war against Japan, Reingold, "Vannevar Bush's New Deal For Research," 302.

40. Lynne Page Snyder, "Passage and Significance of the 1944 Public Health Service Act," *Public Health Reports* 109 (199): 721-724; "Legislative History of Public Law 410", Wyndham Miles files, NLM/HMD. For a contemporary account of the impetus driving research consolidation, see Richard H. Heindel, *The Discussion of Federal Research Problems in Congress and the 1943 Appropriation* (Washington, DC: National Resources Planning Board, 1942).

41. Letter, Dyer to Richards, 8/29/44, attached to minutes, CMR meeting 8/31/44. At the 9/21 CMR meeting, Dyer broke down continuing contracts among Army, Navy, and PHS, and reserved a separate section, "basic (in) nature" for extramural administration. Pencil notes, box 8, entry 162.

42. Daniel M. Fox, "The Politics of the NIH Extramural Program, 1937-1950," *Journal of the History of Medicine*, 42 (1987): 454-55.

43. Daniel M. Fox, "The Public Health Service and the Nation's Health Care in the Post-World War II Era," *Public Health Reports*, 109 (1994): 725-727.

44. Robert E. Kohler, "Warren Weaver and Rockefeller Foundation Program in Molecular Biology: A Case Study in the Management of Science," in Reingold, ed., *The Sciences in the American Context: New Perspectives* (Washington, DC: Smithsonian Institution Press, 1977), 275-279.

45. Stewart, *Organizing Scientific Research For War*, 279-83, 284-85.

Chapter 1 Endnotes

1. Daniel M. Fox, "The Politics of the NIH Extramural Program, 1937-1950," *JHMAS* 42 (October, 1987): 447. For a more celebratory approach, see Stephen P. Strickland, *The Story of the NIH Grants Programs* (New York: University of America, 1988), 21-35.

2. Roger L. Geiger, *Research and Relevant Knowledge: American Research Universities Since World War II* (New York: Oxford University Press, 1993), 19-29; U.S. Congress, Senate Committee on Military Affairs, Subcommittee on War Mobilization, Report, *The Government's Wartime Research and Development 1940-1944*, 79th Congress, 1st Session, Part II (July 23, 1945), 23-25, 12-17. Copy in Congressional Information Service microfiche collection, Committee Prints S1977 and S1978, Library of Congress.

3. Harvey M. Sapolsky, *Science and the Navy: A History of the Office of Naval Research* (Princeton: Princeton University Press, 1990), 39-56; Geiger, 30-32.

4. J. Merton England, *A Patron for Pure Science: The National Science Foundation's Formative Years, 1945-1957* (Washington, DC: National Science Foundation, 1982), 28-43, 48-62.

5. Irvin Stewart, *Organizing Scientific Research for War: The Administrative History of the Office of Scientific Research and Development* (Boston: Little, Brown, 1948), 307-308, 313-317; CMR statement by Division Chiefs, 5/16/45, and Vannevar Bush policy statement, 6/4/45, box 10, RG 227, National Archives.

6. Minutes, CMR Executive Committee meetings, 6/7/45, 8/17/45, 9/6/45, in boxes 10-11, entry 162, RG 227. Of 39 contracts approved for transfer to PHS at the 9/6/45 meeting, 24 involved venereal disease studies. Annex 2, 9/6/45 minutes.

7. England, *A Patron For Pure Science*, 16-18; 4/3/45 draft, Palmer Committee Report, 11, box 9, RG 227.

8. Daniel Kevles, "The National Science Foundation and the Debate over Postwar Research Policy, 1942-1948: A Political Interpretation of *Science — the Endless Frontier*," *ISIS* 68 (1977): 18-20. Palmer wanted to "separate medical research from medical education" and thereby protect private universities from "political implications in the public health program." CMR minutes, 4/12/45 meeting, 304, box 9, RG 227.

9. Fitzhugh Mullan, *Plagues and Politics: The Story of the Public Health Service* (New York: Basic Books, 1989), 122-125. Dyer, backed by the Army and Navy representatives, favored a Government board "representative of all interested groups" in biomedicine and "so restricted as to make it impossible for the board to be self-perpetuating." CMR minutes, 4/12/45, 5-6.

10. Fox, *Health Politics, Health Policies*, 61-62; U.S. Congress, House, Subcommittee of the Committee on Appropriations, 79th Congress, 1st Session, *Department of Labor-Federal Security Agency Appropriation Bill, FY 1946*, Part II, 267-279, 283-289, 418.

11. U.S. Congress, Senate, Subcommittee of the Committee on Education and Labor, 79th Congress, 1st Session, *Hearings on S.190 and S.1099*, 6/26-28/45, 34-36.

12. Minutes, National Advisory Health Council, 6/19-20/45 Meeting, 12-14, box 2, RG 443, National Archives; U.S. Congress, *Public Law 78-410, Consolidate and Revise the Laws Relating to the Public Health Service, and For Other Purposes*, 7/1/44, in Wyndham Miles papers, legislative contracts, NLM/HMD.

13. Ernest Allen, oral history transcript, 13-15, George Rosen papers, NLM/HMD; minutes, NAHC meeting, 6/19-20/45, 11; U.S. Congress, Senate, Subcommittee on Appropriations, 79th Congress, 1st Session, H. R. 3199, 305-309.

14. Kevles, "National Science Foundation," 24-25; Nathan Reingold, "Vannevar Bush's New Deal For Research; or the Triumph of the Old Order," in idem, *Science, American Style* (New Brunswick: Rutgers University Press, 1991), 310-313.

15. *Science – the Endless Frontier: A Report to the President by Vannevar Bush* (Washington: Government Printing Office, 1945); Draft circular to NAHC and NACC, 8/18/45, box 1 folder 0240, acc. 62A490, RG 90, Washington National Records Center (hereafter WNRC), Suitland, MD.

16. Minutes, Surgeon General's Staff Meeting, 8/17/45, box 146, Station File, RG 443.

17. Minutes, NAHC meeting, 9/28/45, box 2, RG 443.

18. Wyndham Miles manuscript, "NIH Legislative History," PL 410, title III, 78th Congress, 2nd Session, NLM/HMD.

19. Minutes, NAHC meeting, 9/28/45, 2.

20. Van Slyke, oral history transcript, 21-26, George Rosen papers, NLM/HMD; draft, "History and Outline of the Research Grants Division," attached to Dyer to W. E. Ferebee, 9/7/46, box 143, Organizations File, RG 443.

21. Memorandum, Van Slyke to Dyer, "Transfer of OSRD Funds to U.S. PHS..." 10/2/48, with attached contract list, 0745 Research Grants, box 142, Organization File, RG 443; Norman Topping, *Recollections* (Los Angeles: University of Southern California, 1990), 23-24.

22. Fox, "Politics of the NIH Extramural Program," 458-459.

23. U.S. Congress, Senate, Subcommittee of the Committee on Appropriations, 79th Congress, 1st Session, *First Deficiency Appropriation Bill for 1946*, 30-31; Charles W. Straub to R. E. Dyer, 11/9/45, 0745 Research Grants, box 142, RG 443, and memoranda, J. D. Hall to C. Van Slyke, "Oral request relating to fiscal procedures for handling expected grant program of the Institute of Public Health," 11/21/46, Referral and Review Branch historical files, regulations board, DRG Archives.

24. The PHS position on the Magnuson and Kilgore bills is in "Joint Report of the NAHC and NACC," 9/28/45, attached to minutes, NAHC meeting, same date, box 2, RG 443. For a fuller explication see "Analysis of Legislation Now Pending in Congress with Regard to A Postwar Program for Scientific Research," n.d., in 01 National Science Foundation, DRG Archives.

25. Ernest Allen, oral history transcript, 1-3, Steven Strickland interviews, accession 464, NLM/HMD.

26. Research Grants Office (RGO) Progress Report, 1/15/46, box 142, Organizations File, RG 443.

27. Memoranda, Allen to Dyer, 2/20/46 and 3/8/46; RGO monthly report, with attached project list dated 3/7/46, all in RGO folder, box 142, RG 443.

28. Letter, Van Slyke to Dr. C. W. Carpenter, 3/29/46; memorandum, Dyer to J. Crabtree, SGO, 4/4/46, in Outline 1 (hereafter, O1), legal folder, DRG Archives. The Division Archives consist of inactive files retired by the Immediate Office of the Chief from 1956 to 1964, plus backfiles from the Referral and Review Branch retired in the 1980s. The former are organized as subject files according to then-current PHS alpha-numeric classifications. The Office made six successive filings, designated "Outlines," with the following chronological coverage: Outline 1, 1945-1955; Outline 2, 1945-

1955; Outline 3, 1956-1958; Outline 4, 1959-1960; Outline 5, 1961-1962; Outline 6, 1963-1964.

29. "Applications for Abstracting and Presentation to the NAHC Meeting, March 7 and 8," attached to 1/15/46 RGO Progress Report; 1/8/46 RGO Progress Report, box 142, RG 443; National Research Council/U.S. Public Health Service, Meeting of Penicillin Investigators, 7 and 8 February 1946, 1-3, 192, National Library of Medicine, general collection.

30. Memorandum, Van Slyke to Dyer, 5/6/46, RGO folder, box 142; Study Section roster in Research Grants Division draft pamphlet, "Research Assistance," 10/10/46, 11, Research Grants Applications, box 143, RG 443, U.S. Public Health Service, Food and Drug Administration, National Research Council, Penicillin Conference, 26-27 March, 1946, 126-127, 203-8, NLM. NLM general collection spells out the procurement function performed by the Antibiotics and Syphilis Study Sections.

31. Minutes, NAHC meeting, 5/10-11/46, box 2, RG 443; Van Slyke to Dyer, 5/16/46, box 142.

32. Minutes, NAHC meeting, 3/8-9/46, box 2; memoranda, Van Slyke to Dyer, 5/16/46 and 5/6/46, RGO folder, box 142, RG 443; letter, W. F. Draper, Acting Surgeon General, to Watson B. Miller, Federal Security Administrator, to W. F. Draper, "Establishment of Research Grants Office," 6/13/46, both in memoranda file, Referral and Review Branch historical files.

33. Typescript copy with original signature, 3/13/46, RGO folder, box 142; minutes, NAHC meeting, 5/10-11/46, box 2, RG 443. The disposition actions were (1) Approved, (2) Disapproved, (3) Referred to Special Study Section, (4) Approved with designated modifications, (5) Approved with authority given to RGO for administrative determination of certain items in question, and (6) Disapproved with advice to applicant as to preparation of application for resubmission.

34. Memorandum, Dyer to Switzer, 5/9/46, folder 0745 Research Grants, box 142. Recognizing that funds could again become limited, Switzer asked Dyer to establish priorities, in planning and in study section structure, to avoid operating on a "project basis." Van Slyke to Dyer, 5/6/46.

35. Minutes, NAHC meeting, 6/14/46, with applications list (Allen's copy), folder 0745 Research Grants, box 142, RG 443.

36. Memorandum, Van Slyke to Dyer, "Consultants to the Public Health Service," 8/7/46, RGO folder, box 142. A total of 132 consultants are listed, and Pharmacology and Bacteriology were next to organize. Of the nine original Executive Secretaries, six held PHS commissions and seven were serving or went on to serve at the level of institute director.

37. U.S. Public Health Service, *Annual Report, Fiscal Year 1946*, 299; memorandum, Van Slyke to Dyer, 7/29/46, RGO folder, box 142, RG 443.

38. U.S. Public Health Service, *Annual Report, 1946*, 232-233; Mary G. Munger, *Growth of the Extramural Programs of the National Institutes of Health (FY 1946 through FY 1958)*, Statistics and Analysis Branch, DRG, 2/19/60, 60-63, 75.

39. Memoranda, Planning Subcommittee for the Correlation of Public Health Service Grants Activities to Dyer, 7/23/46, RRB files, "General Circulars Folder." The five PHS research grant authorities were NIH/RGO, Mental Hygiene Division, National Cancer Institute, Venereal Disease Division, and Tuberculosis Control Division.

40. Letter, Dyer to R. M. Pirie, personnel folder, Research Grants Division, box 141, Organizations File, RG 443; signed RGO organizational tables, 3/4/46 and 8/12/46, O1 Organizational Charts, DRG Archives.

41. Federal Security Agency, General Circulars 100 and 102, Referral and Review Branch historical files, General Circulars folder, DRG Archives; Munger, *Growth of the Extramural Programs*, 3.

42. Signed RGD organizational table, 4/17/47 O1 Organizations; Bess Furman, *A Profile of the United States Public Health Service, 1798-1948*, DHEW Pub 73-369 (Washington, DC: GPO, 1973), 444-45.

43. C. J. Van Slyke, "New Horizons in Medical Research," *Science*, 104 (1946), 559-560; minutes, NAHC meeting, 9/27-28/46, box 2, RG 443.

44. Memorandum, Van Slyke to NAHC, October 1946, with 49 excerpts attached, Referral and Review Branch historical files.

45. Memorandum, Van Slyke to Dyer, 3/7/47, O1 National Science Foundation, DRG Archives.

46. Van Slyke, oral history transcript, 36, George Rosen papers, NLM/HMD. The concentration on experimental therapeutics carried forward from the first grant cycle, in which the Syphilis and Antibiotics Study sections accounted for 39.8 percent of grant funds approved for 1947. Grants-in Aid Summary, 6/15/46, attached to minutes, 6/14/46 NAHC meeting, folder 0745 Research Grants, box 142, RG 443.

47. Letter, J. E. Webb, Budget Director, to Watson B. Miller, FSA Administrator, 9/20/46, O1 Streptomycin, DRG Archives.

48. Harry M. Marks, "Notes from Underground: The Social Organization of Therapeutic Research," in Russell C. Maulitz and Diana E. Long, eds., *Grand Rounds: One Hundred Years of Internal Medicine* (Philadelphia: University of Pennsylvania Press, 1988), 312-315; letter, H. M. Riggins to Parran, 10/23/46, O1 Streptomycin, DRG Archives.

49. Letter, Miller to Webb, 11/19/46, and Webb to Miller, 12/23/46; extract, *Congressional Record*, 3/25/46, O1 Streptomycin.

50. Memorandum, Van Slyke to Members, Tuberculosis Therapy Study Section, 1/4/47, O1 Streptomycin. This is of a piece with the "priority basis for payment" recognized by the Advisory Council in December. Minutes, 12/6-7/46 NAHC meeting, 15, box 2, RG 443.

51. Marks, "Notes from Underground," 316-319. "Special Report on Tuberculosis Streptomycin Study" by Dr. J. Porterfield, DRG, in minutes, 6/6-7/47 NAHC meeting, box 2, NIH/OD minutes, RG. 443.

52. Transcript, "Adventures in Science," 2/22/47, Columbia Broadcasting Corporation, O2 Speeches.

53. C. J. Van Slyke, "The Tuberculosis Control Program in the Mississippi Valley," speech delivered 9/7-10/47, Chicago, p. 10, O2 speeches, folder no. 2, DRG Archives.

54. Summary of Actions, NAHC, 6/6-7/47 meeting, box 2, RG 433; *Public Health Service News*, September 1947, box 148, Station File, RG 443. During January-July 1947, the Service tracked 110 bills, of which only 5 became law.

55. J. A. Crabtree, memorandum for record, 5/8/47, box 1, folder 1220, Acc. 62-A-490, RG 90, WRNC; Scheele to Van Slyke, 10/24/46, 01 National Cancer Institute, DRG Archives.

56. Minutes, Meeting of Study Section Chairmen and Executive Secretaries, 3/13/48, 2, box 5, RG 443.

57. U.S. Public Health Service, General Circular 102, 8/20/46, in Research 9-3 DRG 1946-1974, NIH/OD Central Files; letter, Watson B. Miller to Sen. Robert A. Taft, 5/2/47, box 1 folder 1220, Acc. 62-A-590, RG 90, WRNC; minutes, NAHC, 10/24-25/47 meeting, 24, box 2, RG 443.

58. U.S. Public Health Service, General Circulars 107 and 107 corrected, 8/14/47 and 9/11/47, in the Office of the Director, NIH Central Files (hereafter OD Central Files), file Research 9-3, folder DRG, 1946-74.

59. Memorandum, L. F. Badger to Chiefs of Divisions and Laboratories, 5/26/45; Report, Ad Hoc Committee on Research Fellowships, 9/26/49, 4; Minutes, Ad Hoc Committee Meeting, 7/18/47, box 143, RG 443.

60. U.S. Congress, House Committee on Appropriations, Subcommittee, 80th Congress, 1st Session, Hearings, *Department of Labor-Federal Security Agency Appropriations Bill*, Part II, 267-268, 275, 464-466.

61. Letter, Van Slyke to Dyer, 10/29/46, 01 Fellowship.

62. U.S. Public Health Service, General Circular no.102, 7/18/47; minutes, Research Policy Committee, 7/10/47 meeting, box 143, RG 443.

63. Report, Ad Hoc Committee on Research Fellowships, 9/26/49, box 143; memorandum, Manley W. Kilgore to Office of the General Counsel, PHS, "Public Health Service Research Program," 2/11/48, in folder, "General Counsel Decisions," Referral and Review Branch historical files.

64. Minutes, Policy Committee on Research Fellowships, 3/2/48 and 7/20/48 meetings, box 143, RG 443; letter, J. E. Webb to O. E. Ewing, 6/11/48, 01 Fellowship, DRG Archives. In January, with new applications arriving at a rate of 65 per month, the Division suspended awards for the rest of the fiscal year. DRG grants estimate, 1/26/48, folder 0745, box 142, RG 443.

65. Office of the Surgeon General, Proceedings, 47th Annual Conference, Surgeon General, Public Health Service with State and Territorial Health Officers ... 11/15-17/48, 5-6. Copy in NIH Library.

66. Agenda, Policy Committee 6/7/48 meeting, Research Grants folder, box 142; minutes, Policy Committee meeting, 8/24/48, box 143; file memorandum, Allen to Van Slyke, 5/7/48; memoranda, SG Scheele to Van Slyke, 7/13/48, 01 Training Committee, DRG Archives.

67. U.S. Public Health Service, *Annual Report*, 1949, 58 no. 9. Eleven symposia were held by sections during FY 1949. See also James H. Cassady, "Stimulation of Health Research," *Science*, 145: 3635 (1964) 897-902.

68. Minutes, NAHC meeting, 3/14-15/47, 8.

69. Minutes, Meeting of Study Section Chairmen and Executive Secretaries, 3/13/48, p.1, 6, box 5, NIH/OD, RG 443; Dr. Irving Fuhr, interviewed by Richard Mandel, 12/22/93; Dr. J. Franklin Yeager, interviewed by Wyndham Miles, acc. 548, NLM/HMD, 4-5; minutes, Physiology Study Section, 5/6/48, p. 2, Referral and Review Branch, DRG.

70. Memorandum, Price to Dyer, 4/1/49, Sub: Personnel Activities, folder RGD-Personnel, box 141, RG 443.

71. Minutes, NAHC meeting, 10/24-25/47, box 2, RG 443.

72. Minutes, Meeting of Study Section Chairmen and Executive Secretaries, 3/18/48, box 5, RG 443.

73. Division of Research Grants and Fellowships, *Annual Reports of the Study Sections*, 8/25/48, NIH Library.

74. DRG, Administrative Report, in minutes, Physiology Study Section, 1/26/49 meeting; PHS/DRGF, Abstract of Laws, Regulations and Policy, 3/13/48, policy file, Referral and Review Branch historical files.

75. U.S. Public Health Service, *Annual Report*, 1949, 33-34; minutes, NAHC meeting, 10/22-23/48, 3-4, 9, box 3; memorandum, Kidd to Dyer, 9/23/49, box 142, RG 443.

76. Report, Syphilis Study Section, "Analysis of Penicillin Study," 9/2/48; memorandum, Reynolds to Price, 9/6/48, 01 Penicillin, DRG Archives.

77. Letter, Charles E. Smith, MD, to Sen. William F. Knowland, 1/19/48, Committees 2-7, Advisory Councils and Study Sections (1948-1971), OD Central Files.

78. Geiger, *Research and Relevant Knowledge*, 42-46; George B. Darling, "Can We Pay for Our Medical Schools?," *Atlantic Monthly*, 195 (1950) 6: 38-42.

79. Memoranda, Price to Dyer, 5/13/49, Allen to Price, 5/23/49, Meader to Price, 7/25/49, 01 Institutional or Block Grants/Medical Schools, DRG Archives; memoranda of telephone call with Senator Kerr's office, D. Price, 10/25/49, folder 0745, box 142, RG 443.

80. Minutes, Institute Directors meeting, 12/1/49, OD Central Files.

81. Memoranda, Ewing to Parran, 1/5/48, and Parran to Dyer, 2/3/48, 0745 Research Grants, box 142. The staff did note that employee baseball teams had voted to desegregate and that lunchtime games were now drawing substantial crowds and causing traffic jams. Minutes, NIH Luncheon Staff Meeting, 5/26/49, folder 1340, box 150, RG 443; Luncheon Staff Meetings, 5/28/49 and 5/26/49, folder 1340, box 150, RG 443 and Committee 2 SLF, 1948-51, OD Central Files. On the slow pace of desegregation in public health generally, see E. H. Beardsley, "Good-Bye to Jim Crow: The Desegregation of Southern Hospitals, 1945-1970," *Bulletin of the History of Medicine*, 60 (1986): 367-75.

82. Memoranda, R. M. Pirie to Officers in Charge, 2/3/48, 01. Loyalty, DRG Archives; Pirie to Dyer, 7/27/48 and Dyer to Pirie, 11/12/48, folder 0745 Research Grants, box 142, RG 443.

83. Memoranda, Dyer to Pirie, 1/10/49 (not sent); Price to Dyer, 5/20/49; Price to Dyer, 5/24/49, Sub: Summary of the Research Fellowship Program, same file.

84. Memoranda, Stone to Price, 5/25/49, w/att, folder 0745, box 142;

memoranda, Surgeon General to Bureau Chiefs, 6/3/49; Hansen to Price, 6/6/49; Price to Dyer, 6/9/49, misc. docs. folder, box 143; Surgeon General to Bureau, Division, and Office Chiefs, 7/28/49, fellowship file, box 143.

85. Memorandum, Allen to Topping, 1/19/50, 01 Interdepartmental to Subcommittee/Research Grants Contracts, DRG Archives.

86. Van Slyke oral history transcript, 26-28, George Rosen papers, NLM/HMD.

87. Memorandum, Allen to Ladimer, 9/30/49, 01 Management Improvement Projects, DRG Archives.

88. U.S. Public Health Service, *Annual Report*, 1950, 22-23; Division of Research Grants and Fellowships, *Annual Report*, Fiscal Year 1950, 8-9, 12.

89. Minutes, Meeting of Study Section Chairmen and Council Representatives, 3/26/49, 01 Grants.

90. Minutes, National Advisory Cancer Council, 6/13-14/49 meeting, box 13, RG 443; Ralph G. Meader, oral history transcript, 8-10, Acc. 464, NLM/HMD.

91. David E. Price, oral history transcript, 5-6, Acc. 464, NLM/HMD; memorandum, Price to Norman Topping, "Study Section Organization," 9/1/48, 01 Initial Review Groups, DRG Archives. The change was accepted in principle but not implemented.

92. David E. Price, oral history transcript, 22-24, papers of George Rosen, NLM/HMD.

93. J. Beecher and P. Janus, "Management Analysis of the Division of Research Grants and Fellowships," National Institutes of Health, 3/15/49, 14-18, 29-32, 02 Organization, DRG Archives. U.S. Public Health Service, *Annual Report*, 1949, 28-29, and *Annual Report*, 1950, 8-9.

94. Memoranda, Sebrell to Chief, Division of Commissioned Officers, 12/18/50, and Topping to All Personnel, NIH, 12/7/50, file Research 9-3 DRG/ 1946-74, OD Central Files.

95. Dyer notes, attached to draft general policy statement, 5/31/46, daily boards, Referral and Review Branch files.

96. Bush, *Science — The Endless Frontier*, 90.

97. Richard H. Shryock, *American Medical Research, Past and Present* (New York: Commonwealth Fund, 1947), 288-90, Chapter 6; Statement for the Bureau of the Budget, approved by NAHC 12/27/46, box 142, Research Grants Folder, RG 443.

98. Stenographic copy, A. Arnold to C.J. Van Slyke, 12/4/46, Sub: "Grants for Research....," Chairman's Grants folder, SEG historical file, DRG Archives.

99. Stenographic copy, Allen to R. Learmouth, NIH Financial Management Officer, 5/4/46, same file.

100. Letter, Allen to Dr. H. Sims, 1/10/47, same file.

101. J. Beecher and P. Janus, "Management Analysis and Attitude Survey of the Division of Research Grants and Fellowships, Public Health Service," 29-32, 5/17/49, in 02 Organization, DRG Archives.

102. Minutes, National Advisory Health Council, 10/24-25/47, 208, 216, in box 5, Minutes of Meetings, NIH/OD, RG 443.

103. "Statement to the Bureau of the Budget," 9/27/46, in folder Research Grants, box 142, RG 443; compiled from DRGF, "Annual Reports of the Study Section," 9/23/48, NIH Library.

104. Minutes, meeting of Study Section Chairmen and Executive Secretaries, 3/13/48, 5; rating sheets for Physiology, Radiobiology, Sanitation, and Surgery, in box 5, Minutes of Meetings, NIH/OD, RG 443.

105. DRGF, Administrative Report, April-June, 1949; minutes of meeting, Study Section Chairmen and Executive Secretaries, 3/26/49, 4, in box 5, NIH/OD, RG 443.

106. Memorandum, Van Slyke to Surgeon General, 7/30/46, attaching draft General Circular, "Correlation in Administration of Grants-in-Aid and Other Assistance in Research," 7/26/46, General Circulars folder, Referral and Review Branch historical file.

107. Ora Marshino, NCI Grants Administrator, comments on Van Slyke 7/30/46 memorandum, same file.

108. Proceedings, National Advisory Cancer Council (NACC), 12/11-12/47, vol. 1, box 11, NIH/OD files, RG 443. A mail ballot was introduced at this meeting, but only 25 of 63 applications received 4 of 6 votes in approval or disapproval. A majority, 38 of 63, required independent review, and for this purpose a list of 250 specialists was drawn up. However, the Council continued to reject scientific review by outside committees.

109. Minutes, National Advisory Cancer Council, meetings on 3/18-19/49, 6/13-14/49 (p. 6), and 6/11-13/50 (p. 3), in box 11, National Research Institutes/NACC transcripts, entry 26, RG 443; memorandum, J. Heller, Director, NCI, to D. Price, Chief, DRG, "Use of Study Sections for review of cancer research grant applications," 6/20/49, in 01 Initial Review Groups, DRG Archives. The agreement stipulated that "in preparing (cancer) grant applications for review by the respective study sections, and in making presentations to those sections, the Executive Secretaries concerned shall be responsible to the Chief and the Assistant Chief of the Cancer Research Grants Branch."

110. Office of the Surgeon General, "Public Health Service Research Grants to Study Section Members," 4/18/50, I-(2), IV-(13-19), 02 Research/Administrative Research in NIH — Sebrell and Kidd, March 1952.

111. Kenneth M. Endicott and Ernest M. Allen, "Trends in Public Health Service Research Grants, 1946-1952," 6-7, 17, 23.

Chapter 2 Endnotes

1. Kenneth M. Endicott and Ernest M. Allen, "The Growth of Medical Research 1941-1953 and the Role of Public Health Service Research Grants," *Science* (9/25/53), 118:337-43; Irving Ladimer, "Trends in Support and Expenditures for Medical Research, 1941-1952," *Public Health Reports* (February 1954), 69:111-22. As of October 1, 1950, the organizational title "Division of Research Grants and Fellowships" was abolished and the title "Division of Research Grants" was reinstated, with no accompanying change in function.

2. Monte M. Poen, *Harry S. Truman Versus the Medical Lobby: The Genesis of Medicare* (Columbia: University of Missouri Press, 1979), 119-23; letter, C. V. Van Slyke to Department Heads of Medical Schools, 4/15/48, in 02 National Health Assembly, DRG Archives. Van Slyke coordinated the survey and served as secretary to the Assembly's research section.

3. Remarks, 5/1/48, in Harry S. Truman, *The Public Papers of the Presidents of the United States, 1948*, 239-43; minutes, 5/1/48 and report, Research Section, National Health Assembly, 5/3/48, 4-8, 02 National Health Assembly.

4. Minutes, Research Section Steering Committee, 4/10/48 meeting, p. 6. Dr. Van Slyke served as Technical Secretary for this agenda group. For the background foundation grant principles that the Assembly drew on for this recommendation, see Robert E. Kohler, *Partners in Science: Foundations and Natural Scientists, 1900-1945* (Chicago: University of Chicago Press, 1991), 265-84, 395-406.

5. *Congressional Quarterly, Congress and the Nation*, 1132-34. For the Truman Administration's position, see President's Scientific Research Board, *The Nation's Medical Research*, vol. 5 of *Science and Public Policy: A Report to the President* by John R. Steelman (Washington, DC: GPO, 1947), 10-11, 41-45, 113-18.

6. FSA, *Annual Report of the Federal Security Agency. Public Health Service*. 1948, 321-322; NIH, *Annual Report of Program Activities. Division of Research Grants. Calendar Year 1960*, 1.

7. Fox, *Health Policies and Health Politics*, 149-153, 158-161; Poen, *Harry S. Truman and the Medical Lobby*, 177-189.

8. Scheele, "A New Era in Medical Research and Practice," *American Journal of Medicine*, 9 (1950), 1:1-2.

9. Memorandum, Truman to Ewing, 7/21/50, box 2, ORP Subject Files, RG 443; memorandum, Scheele to Ewing, "Report on President's Letter of July 21, 1950," 8/14/50, folder "Policy, 1945-53," Referral and Review Branch files, DRG Archives; minutes, NAHC meeting, 10/20-21/50, p. 4, box 2, OD meeting file, RG 443. The larger trends are in Mary Munger, *Growth of the Extramural Programs (FY 1946 through FY 1958)*, Statistics and Analysis Branch, (February 1960), 214. For a different interpretation, see Stephen Strickland, *Politics, Science, and Dread Disease* (Cambridge: Harvard University Press, 1972), 84-87.

10. Memorandum, Dyer to Institute Directors, 8/24/50; C.V. Kidd drafts, "Assumptions Underlying NIH Defense Planning," 8/2/50, Defense/1950 folder, and "Justification of \$30,000,000 for support of Medical Research in Defense Plans," n.d., Magnuson Amendment folder, both in Office of Research Plans Subject File, box 2, RG 443.

11. *Congressional Record*, 96:153, 8/3/50, 11841-54, 11876; NIH appropriations history, 1938-1963, Referral and Review Branch, Appropriations folder, DRG Archives.

12. Memorandum, Dyer to Institute Directors, 7/25/50, Defense/1950 folder, RG 443.

13. C.V. Kidd report, "Defense Activities of the National Institutes of Health (1950-1952)," 5/13/54, 25-34, Magnuson Amendment folder.

14. Letters, R. Snyder to E. Allen, 10/27/53, and Allen to Snyder, 11/9/53; memorandum, Allen to Van Slyke, 11/17/53, 02 Research/Primate Colony, DRG Archives.

15. Memoranda, Hass to Sebrell, "Proposed Extramural Program...", 1/25/51, and Allen to Sebrell, 3/7/51, 01 National Microbiological Institute; Allen to Sebrell, 2/19/53, 02 National Institutes of Health/NMI, DRG Archives; minutes, 10/19/51 NAHC meeting, 7-8, Box 3, OD/NIH minutes f, 6, RG 443.

16. Minutes, Luncheon Staff Meeting, 9/13/51, Committees 2, Office of the Director, NIH, Central Files; memorandum, Hass to Topping, 1/15/51, Defense/1950 folder, box 2, RG 443.

17. Kidd, report, "Defense Activities," 5/13/52, 11-16; Kidd, Statement on Mobilization of Scientific and Medical Manpower, 1-17, attached to minutes, Advisory Councils, Joint Session 2/17/51 (Scheele copy), and Supplement I, "Supply of and Demand for Engineering, Scientific, and Medical Personnel," in minutes file, Office of the Director, box 1, RG 443.

18. Minutes, Committee on Administration of NIH Grants and Awards, 7/19/50 meeting; memorandum, Kidd to Institute Directors, 8/1/50, Office of Research Planning Subject Files, box 17, RG 443.

19. I. Ladimer, "Report of Task Force," 10/5/50, same file. Scheele had wanted to centralize training, construction, and control grants in DRG.

20. Draft, "Summary Recommendations on Administration of Extramural Programs," 9/10/51, same file; minutes, Institute Director's Meetings, 9/6/51 and 10/2/51, Committees 2-3, OD Central Files.

21. Minutes, ECEA meeting, 3/6/52, Committees 2-7, OD Central Files.

22. Memorandum, Price to Yeager, 11/20/51, Committees 2-7. In February 1952, the Institute Directors recognized four permanent committees: Extramural Affairs, Scientific Directors, Commissioned Officers, and the Clinical Center Medical Board. Minutes, 2/3/52 meeting, p. 2.

23. Memoranda, L.E. Ring to Allen, 8/6/51, and Allen to Ring, 8/10/51; Allen et. al. to Price, 2/7/52 01 Legislation; Appel to Endicott and Allen, 8/18/52, and minutes, Public Health Study Section, 9/8/52 and 1/5/53 meetings, 02 Committees, Standards for Grants Surveys.

24. Memorandum, Allen to Sebrell, 9/10/53, 01 Reports/General.

25. William Pemberton, *Bureaucratic Politics: Executive Reorganization During the Truman Administration* (Columbia: University of Missouri Press, 1979).

26. The Institute Director's original charge to the ECEA was "to review the nature and extent of the unmet National needs that the Institutes are attempting to fill..." Minutes, ECEA meeting, 1/3/52, p. 3, in Committees 2-7/ECEA, 1951-1953. For the context, see Daniel J. Kelves, "K² S²: Korea, Science, and the State" in Peter Galison and Bruce Hevly, eds., *Big Science: The Growth of Large-Scale Research* (Stanford: Stanford University Press), 313-32.

27. Memorandum, Ladimer to Topping, 4/29/52, ORP Subject File, legislation folder, box 26, RG 443.

28. Minutes, Advisory Council joint session, 2/17/51, 11-2; I. Fuhr to E.

Allen, 5/4/51, 02 Appropriations/Indirect Costs; report, Surgeon General's Committee on Medical School Grants and Finances (Reed Report, 1950) Part I, 12-18.

29. Draft report, Intercouncil Committee on Institutional Grants, 5/23-24/52, 14-19, in 01 Institutional Grants/Task Force Reports. Under Dr. Sebrell, NIH accommodated large-scale programmed research but did not support institutional grants, in deference to medical school leaders who feared adverse impacts on teaching and administrative autonomy. See Leonard A. Scheele and W. H. Sebrell, "Medical Research and Medical Education, *Science*, 114 (11/16/57), 517-21.

30. Letter, Allen to D. Barr, 5/29/51.

31. Transcript collection, "Data Collected on Inter-Council Committee on Institutional Grants," 8/10/51; report, Inter-Council Committee on Institutional Grants; 6/23-24/52, 8-10, in Research 8-4, Institutional Grants, 1951-62, OD Central Files.

32. Report, 6-7, 11-13, 14-18; memorandum, Allen to All Study Section Members, 8/15/52, 01 Institutional Grants; report, Conference on Indirect Costs, Mass. General Hospital, 11/18/52 Appendix B, 7-10, in 02 Appropriations/Indirect Costs.

33. Memorandum, Allen to Rourke, 10/6/52, 02 Fellowships/General; Rourke to Allen, 12/3/52 02 Institutional Grants; Price to Sebrell, 1/26/53, 02 Grants/ Institutional.

34. Memorandum, Allen to Kidd, 1/22/54, ORP Subject Files, box 26, folder Grants/Preclinical Support, 1954, RG 443.

35. Minutes, NAHC meeting, 6/26/53, 11, OD minutes file, box 3; Appropriations History 1938-1963, table II, Referral and Review Branch appropriations totals file; transcript, NAHC meeting, 11/23/53, resolution on predoctoral fellowships, in 02 Fellowships/General; memorandum, Allen to Van Slyke, 3/30/53, 02 Appropriations/General.

36. Memorandum for record, D. Price, 8/25/54, and letter, Allen to H. Meadow, 1/27/55, 02 Appropriations/Indirect Costs.

37. "Research Grant Unit of National Institutes Wins Lasker Award," *Washington Star*, 10/30/53.

38. *Annual Report of the Federal Security Agency. Public Health Service. 1951; Annual Report of the Department of Health, Education, and Welfare. 1953; NIH, Longform Annual Report, Fiscal Year 1953. Division of Research Grants*, 6.

39. In the study section reorganization, Virus and Rickettsial Diseases was dissolved, Neurology came into being, Public Health merged with Environmental Health, and Pharmacology merged with Experimental Therapeutics. DRG, *Annual Report, 1953*, 1.

40. Report, Endicott to NAHC, "Research Grant Program Objectives," 6/14/52, 7-12, in folder "Committee on Administration of NIH Grants and Awards," box 17, ORP Subject Files, RG 443; memorandum, Sebrell to All Employees in Building T-6, 7/14/53, and attached petition with 275 signatures, 6/29/53, in Buildings and Grounds 1/T-6, OD Central Files; University of Michigan, Institute for Social Research, *Human Relations in a*

Research Setting: A Study of the National Institutes of Health (Ann Arbor: University of Michigan, 1953), 40, 312-15.

41. Memorandum, Special Republican Study Group to Nelson A. Rockefeller, 11/10/52, in Robert L. Larsen, *The Eisenhower Administration, 1953-1960: A Documentary History* (New York: Random House, 1971), 42-46; William H. Sebrell oral history, NIH Historical Office, 160.

42. U. S. Congress, House of Representatives, Subcommittee of the Committee on Appropriations, *Hearings*, Fiscal Year 1954, Sebrell testimony, 1292; Strickland, *Politics, Science, and Dread Disease*, 90-91.

43. Executive Order 10521, "Administration of Scientific Research by Agencies of the Federal Government," 3/17/54, and Press Release, same date, 02 Orders/ National Institutes of Health, DRG Archives.

44. Ladimer, record of conversation with Dixon, for Shannon and Kidd, May 1954; memorandum, Ladimer to Shannon, 5/26/54, Hoover Commission folder, box 18, ORP Subject Files, RG 443; Ronald C. Moe, *The Hoover Commissions Revisited* (Boulder, CO: Westview Press, 1982), 81-83, 103.

45. Sebrell to Chief, Bureau of State Services, "Proposed Reply to Question 9 of Hoover Commission Inquiry, August 4, 1954," same file.

46. C. V. Kidd, "Notes on Alternative Means of Modifying N.I.H. Programs to Provide More Stable Support for Investigators," 1/21/54, box 26, Grants/ Preclinical Support - 1954 folder, OPR Subject Files.

47. Memoranda, Rourke to Van Slyke, 6/6/54; Sebrell, preliminary staff paper, "Long-Term Support of Investigators in Clinical Science," 4/12/54, same file.

48. Memoranda, Endicott to Scheele, 6/29/54, 01 Preclinical Program, 1954-55; Sebrell to All Study Section Members, 5/12/54, with attached comments and tabulations, in box 26, Grants/Preclinical Support folder, OPR Subject Files. In its "pilot" phase, the program would fund 50 faculty from a 1 percent allotment of the total NIH research budget and was to begin with FY 1955. When legal obstacles prevented implementation in November, the Health Council changed the format from project grants to program grants, allowing each medical school to nominate three candidates. In October 1955, the format was changed again to research fellowships. See Allen to Scheele, 11/1/54, 01 Preclinical Program, 1954-55, and Kidd to Douglas, 10/6/55, box 26, Grants/Preclinical Support, OPR Subject Files.

49. Richard M. Fried, *Nightmare in Red: The McCarthy Era in Perspective* (New York: Oxford University Press, 1990), 178-186; Theodore H. White, "U. S. Science: The Troubled Quest," *Reporter*, 9/14/54, 12-18.

50. Director of Security, PHS to Chief, DRG, 7/23/53, 02 Research Grants/ Surveys; Endicott to Van Slyke, 10/19/53, 02 NIH Records.

51. National Academy of Sciences, "Report of the Committee on Loyalty in Relation to Government Support of Unclassified Research," 3/13/56, 5, 8-11 and attached copy, HEW press release, 4/28/54, in DRG/Grantee Loyalty file, NIH Historical Office.

52. Chief, DRG to Surgeon General, "Reaction of National Advisory Councils on Loyalty Program Pertaining to Research Grant Personnel,"

6/21/54, 02 Personnel/Loyalty; Letter, Dr. John S. Gray, Chairman, Physiology Study Section to Secretary Hobby, 5/12/54, addendum to minutes of meeting, 5/8-9/54, Physiology Study Section; Letter, Dr. Charles Ragan, Chairman, Metabolism and Nutrition Study Section, to Secretary Hobby, 9/20/54, 02 Policy, DRG Archives. For the Peters case, see Jane Pacht Brickman, "Medical McCarthyism: The Physicians Forum and the Cold War," *Journal of the History of Medical and Allied Sciences*, 49 (1994): 398-401.

53. Peters v. Hobby, 75 S. Ct. 790-804 (1955). For the role of NSF, see John T. Wilson, *American Science, Higher Education, and the Federal Government, 1950-1983* (Chicago: University of Chicago Press, 1983), 26-28.

54. Report of the Committee on Loyalty, 3/13/56, 6; Dr. Elvin Kabat to Secretary Folsom, 1/6/58; Shannon to Surgeon General, 1/4/58 and 1/24/58, DRG/ Grantee Loyalty Folder, NIH Historical Office. As of January 24, 1958, the extramural blacklist contained 75 names and was still in use. ECEA minutes, 9/4/58 meeting, Committee 2-7, OD Central files.

55. Elvin A. Kabat, "Getting Started 50 Years Ago - Experiences, Perspectives, and Problems of the First 21 Years," *Annals of the Review of Immunology* (1983) 1:28-32; interview, 4/19/94. Dr. Kabat succeeded in shifting his work to NSF and ONI projects and returned to NIH in 1973 as an extramural advisor to NIH Director Robert Marston.

56. Van Slyke oral history interview 3/8/63, 26-27, George Rosen papers, NLM. Dr. Sebrell's oral history acknowledges that the PHS security files contained mostly defamatory materials. See Sebrell oral history, 164-165, NIH Historical Office.

57. Jane S. Smith, *Patenting the Sun: Polio and the Salk Vaccine* (New York: William Morrow and Co., 1990), 318-324, 350-354, 362-368; Public Health Service, *Technical Report on Salk Poliomyelitis Vaccine* (June 1955), 1-22, 74-79.

58. Allen to Director, National Microbiological Institute, 4/11/55; Shannon to Scientific and Clinical Directors, 4/29/55, 02 Research/Monkeys DRG Archives.

59. Allen to Van Slyke, 5/20/55; memorandum, Sebrell to HEW Regional Directors, 5/13/55; letter, Andrus to Surgeon General, 6/4/55, same file.

60. Allen to Assistant Secretary for Federal-State Relations, HEW, 7/18/55. In 1960, the National Advisory Committee on Rhesus Monkey Requirements was renamed the National Advisory Committee on Primates and began reviewing grant applications as a DRG study section.

61. J. Hardy to Allen and Van Slyke, 4/19/55; Senator John F. Kennedy to NIH Director, 4/19/55; Van Slyke to Sen. Kennedy, 4/21/55, 02 Committees/Hoover Commission (backlog-research grants).

62. Memoranda, Allen to L. Ring, OSG/PHS, 6/16/55 and 6/23/65; Kennedy to Sen. Carl Hayden, 5/18/55 (w/att); letter, Allen to L. White, 5/9/55, same file.

63. Letter, Allen to W. McDermott, 5/24/55, w/att, O2 Committees/Senate Appropriations Committee; "Forecast of Recommended but Unpaid

Research—F.Y. 1956,” 10/17/55; “Current Backlog or Surplus Among NIH Institutes,” 11/25/55, box 89 folder 33, “NSF-1955,” acc. 90-62A-64, WNRC.

64. Strickland, *Politics, Science and Dread Disease*, 100-108; *Congressional Quarterly, Congress and the Nation, 1945-1978*, 1137-38.

65. Appropriations totals, Referral and Review Branch; J. Murtaugh, memoranda for the record 8/14/56, box 20, Executive Committee for Extramural Affairs, OPR, RG 443.

66. Minutes, ECEA meetings, 3/9/56 and 8/2/56, Committees 2-7, OD Central Files; Program Operations Report to the Secretary, April-June, 1956, 1, in box 20, OPR Subject Files, RG 443.

67. Memorandum,, P. Sapor, NIMH Grants and Fellowships Branch Chief, to Van Slyke, 10/31/56. NSF compensated reviewers 1 day of home-work for each conference day, the report pointed out, and this standard would increase NIH Chairman's grants an average of \$6,000 yearly, or \$141,750 in aggregate. ECEA materials, box 20, ORP Subject File.

68. Memorandum, Larsen to Allen, 9/28/55 02 Communications.

69. Memorandum, Shannon to Institute Directors, 3/28/56, box 89 folder 46, acc. 90-62A-64, WNRC.

70. Kidd to Allen, “Background Document for April 4 Meeting on Program Grants,” 3/27/56, and J. Murtaugh, interview notes, 2/13/68, box 88, folder 5, same accession. In the OPR survey, Van Slyke was counted as opposing program grants, Allen favored limited use, and Kidd accepted full development; NAHC minutes, 3/5-6/56, 6/12-13/56 meetings, Office of the Director minutes file, box 4, RG 443.

71. Transcript, NAHC discussions, 6/22/55, attached draft, “Modification of the Research Grants Program to Meet Changing Needs,” 8/17/55, 6-7, in box 26, Grants/Preclinical Support folder, ORP Subject files, RG 443; NSF Special Committee on Medical Research, “Medical Research Activities of the Department of Health, Education and Welfare” (Long Report), December 1955, 24-26, 50-52, in 02 Committees/General; Strickland, *Story of the NIH Grants Program*, 54-57.

72. Letters, Eisenhower to Folsom, 7/14/56, and Folsom to Eisenhower, 7/19/56, copies attached to ECEA minutes, 8/2/56 meeting, Committees 2-7, OD Central Files.

73. Committee of Consultants on Medical Research to the Subcommittee on Departments of Labor, Health, Education and Welfare of the Committee on Appropriations, U.S. Senate, 86th Congress, 2nd Session, *Federal Support of Medical Research* (Washington, DC: GPO, 1960), 60; appropriations tables, FY 1938-1963, tables 1A and 2.

74. Report, Assistant Chief, DRG to Deputy Director, NIH, “Quality of Grants Review,” 8/6/60, 2-3 and Exhibit 2A, in O4 Grants 3-3, DRG Archives.

75. U.S. Department of Health, Education and Welfare, *Annual Report, 1956*, Public Health Service, 156; *Annual Report, 1960*, Public Health Service, 175. Operating branches in 1960 were the Grants Management Branch, the Research Grants Branch, the Research Fellowships Review Branch, and the

Statistics and Analysis Branch.

76. Memorandum of Information, Health Research Facilities Program, 9/28/56, O3 Committees/Study Sections; minutes, National Advisory Health Research Facilities Council, 9/24-25/56 meeting, box 1, OD/Minutes, RG 443; Judson Hardy, "History of the Extramural Program" (1959), ms, NIH Historical Office, DRG/General, p.4.

77. U.S. Congress, House of Representatives, 85th Congress, 2nd Session, House Document No. 234, *Second Annual Report of the Surgeon General of the Public Health Service, Summarizing the Activities of the Health Research Facilities Program* (Washington, DC: GPO, 1958), 2, 8-9.

78. Order, "Responsibility of the Division of Research Grants for Reviewing and Processing Applications for Public Health Service Grants," 10/30/57, O3 Orders/General; Division of Research Grants, *Annual Report, Calendar Year 1960*, 2.

79. Francis O. Schmitt, *The Never Ending Search* (Philadelphia: American Philosophical Society, 1990), 189-94; Irvin Fuhr, interview with Dr. Richard Mandel, 12/22/93; Allen to Shannon, 3/13/56, O3 Meetings 3-4.

80. D. Copeland to Allen, Lindsay, and Himmelsbach, 10/25/57, O3 Research/ General; DRG, *Annual Report*, 1957, 17-19; *Annual Report*, 1959, 17; memorandum, Allen to National Advisory Councils and Study Sections, "Recommendation of the Cell Biology Study Section for Special Programming in Cell Biology," 10/24/58, O3 Committees/Study Sections. For the impact of the Clinical Center construction project, 1947-1953, on NIH development, see Richard Mandel, *Beacon of Hope: The Clinical Center through Forty Years of Growth and Change in Biomedicine* (Bethesda: National Institutes of Health and Research America, 1993), 3-9.

81. S.P. Hatchett to M. Adler, 1/16/59, with draft section of annual calendar report; R. Wiley to E. Allen, 12/29/58, draft justification of special program needs, both in Basic Materials Folder 2, DRG Archives.

82. DRG, *Annual Report*, 1957, 31-35; memoranda, Lindsay to NAHC, 10/12/57, O3 Meetings 3-4/1956-1957; Allen to Shannon, 11/8/57, O3 Appropriations 6; Allen draft, "New Programs and Organizational Changes in the Division of Research Grants," 10/10/57, attached to DRG Administrative Report, January 1958.

83. Minutes, NAHC meeting, 3/11-12/57, 12; Allen to Shannon, 5/23/57, O3 Personnel 2/General; DRG, *Annual Report*, 1957, 20-21; Dr. Clifton Himmelsbach, interview with Dr. Richard Mandel, 6/16/94.

84. Report, Inter-Study Section Ad Hoc Committee on Radiation Hazards, 11/15/58, O3 Committees (Ad Hoc); memoranda, Himmelsbach to Allen, 7/21/59, O4 Education 2; Himmelsbach to Shannon, "Material for 'Survey of the Federal Organization of Radiological Health Activities,'" 4/9/59, O4 Radiation 2; memorandum, Allen to Shannon, "Evaluation of Multi-disciplinary Research Projects," 10/21/57, ECEA minutes, Committees 2-7, OD Central Files. The designation Medical Advisor was discontinued after Himmelsbach became Clinical Center deputy director in 1959.

85. Competing applications reviewed jumped from \$47 million to \$93

million during FY 1956–FY 1957, but ORP claimed that at least seven types of applications were not being tallied. G. Frey to E. Allen, “DRG Chairman’s Grant Program,” 03 Appropriations; J. Murtaugh to Shannon, 10/30/57, box 89 folder 26, Extramural Operations Survey, Acc 62-A-64, RG 90, WNRC.

86. Memoranda, Van Slyke to Institute Directors, 4/8/57, Research 9-3 DRG 1946-1974; K. Parent to E. Henschel, “Explanatory Statement on Proposed Reorganization...,” 6/13/57, Review on Referral Branch files, reading board copy; Murtaugh to Shannon, “Functions of the Office of Research Planning,” 8/22/57, with Shannon’s penciled acceptance on back cover sheet, Research 9-3 DRG, OD Central Files.

87. Murtaugh to Shannon, “Current Status of Extramural Survey...,” 10/25/57, and Allen to Murtaugh, “Reaction to Proposed ‘Statement of Functions, Office of Research Planning,’” 8/29/57, both in Basic Materials 2, DRG Archives; ORP draft report, “Operation of the Extramural Programs of the NIH,” January 1958, 44-50, in Research 9-3 DRG. The files contain only this interim report, as the survey was never completed. Survey Group included Joseph S. Murtaugh, Acting Chief ORP; Gilbert J. Frey, DRG; Phillip Janus, Office of Management Policy Appraisal; and Roberta M. Downes, Management Analysis Branch.

88. The Secretary’s Consultants on Medical Research and Education, *The Advancement of Medical Research through the Department of Health, Education and Welfare* (Washington, DC: Office of the Secretary, DHEW, 1958), 14-15, 78-87; minutes, Institute Directors meeting, 4/2/58, Committees 2-3. For Shannon’s relationship with Bayne-Jones, see Albert E. Cowdrey, *War and Healing: Stanhope Bayne-Jones and the Maturing of American Medicine* (Baton Rouge: Louisiana State University Press, 1991), 186-89.

89. Director, NIH to Surgeon General, “Reorganization Proposals Affecting the Division of Research Grants,” 6/11/58; Secretary, HEW to Surgeon General, “Establishment of the Division of General Medical Sciences ...,” 7/16/58, 03 Organization 3-2/DGMS, DRG Archives.

90. Draft, “Highlight Summary of Current NIH Programs and Activities,” 10/8/58; memorandum for record, J. Murtaugh, “Discussion with Dr. Shannon and others concerning the launching of the statistical analytical function in DRG,” 1/29/59, Research 9-3, DRG/1946-1974, OD Central Files. Memorandum, G. Frey to Chief, Division of Business Operations, “Request for a Data Processing Study,” 5/4/59; 02 Basic Materials 2, DRG Archives.

91. Minutes, Advisory Committee on Computers in Research, 9/20-21/60 and 10/16/60, in 04 Meetings 8-4/Computers, DRG Archives.

92. Memorandum, Acting Director, NIH to Chief, Administrative Materials Branch, PHS, 7/23/57, Referral and Review Branch historical files, Organization folder; minutes, NAHC meeting, 6/19/58, 3-4, box 3 OD/NIH minutes file, RG 443.

93. Report, “Training Grants and Awards of the National Institutes of Health,” August 1960 (Endicott Report), 7-9, in Research 8-8/Training Grants, OD Central Files.

94. Memoranda, Shannon to Institute Directors, 11/4/60, and Powell to Yeager, 6/24/60, Research 8-2/Center Grants.

95. DRG, *Annual Report, Calendar Year 1958*, 3; DRG, *Annual Report, Calendar Year 1960*, 4; Assistant Chief, DRG to Deputy Director, NIH, "Quality of Grants Review," 8/16/60, 2, in 04 Grants 3-3, DRG Archives.

96. Memorandum, Henschel to Chief, Division of Research Services, 12/4/56; Discussion Draft, Executive Officer, NIH to Institute Directors, "Office Space," 11/24/59, both in Buildings and Grounds 2/Bldg. 31, OD Central Files.

97. Report, "Meeting NIH Space Needs for the Next Decade," January 1960, in Buildings and Grounds 9/Space, OD Central Files.

98. GAO, *Review of Research, Training, and Fellowship Grant-In-Aid Programs Administered by the National Institutes of Health, Public Health Survey, Department of Health, Education and Welfare*, November 1959 (Washington, DC: GAO, 1959), 21-37.

99. Minutes, NAHC meetings, 2/20-21/48, 274-76; 6/11-12/48, 357-58, in box 2, NIH/OD minutes file, RG 443.

100. Draft, "Summary Recommendations on Administration of Extramural Programs," 9/10/51, Institute Directors meeting file, Committees 2-3/ECEA, OD Central Files. Mental Health's exception to separate review functions persisted until 1959, when Dr. Shannon transferred the Psychopharmacology Review Committee to DRG. See memorandum, Allen to NIH Deputy Director, "Transfer of the Psychopharmacology...", in 04 Correspondence/NIH Executive Officer, DRG Archives.

101. Memorandum, Allen to NIH Executive Officer, "Transfer of the Mental Health Psychopharmacology Review Committees into the Division of Research Grants," 7/9/59, 04 Correspondence/NIH Executive Office, DRG Archives.

102. DRG, *Administrative Report*, May 1950; draft, "Study Section Priority Rating System," 3/26/64, attached to P. Stapp to J. P. Saunders, "Priority Ratings," 4/13/64, Referral and Review Branch historical files; minutes, Physiology Study Section, 1/5-6/53 meeting. Minutes, Surgery Study Section, 1/11/53, 5; DRG, "Information Concerning Scientific Review of Public Health Service Research Grants," 4/1/59, 4, in 02 Basic Materials, DRG Archives.

103. Minutes, NAHC 6/10/50 meeting, 845, Supplement II, box 2, NIH/OD minutes file; report, "Research Grants Program Objectives," 6/14/52, 4, box 3, same file.

104. Curt P. Richter, "Free Research versus Design Research," *Science*, 118 (7/24/53), 91-93; memorandum, Allen to Study Section Members, "Communication to National Advisory Council of Study Section Review of Research Grant Applications," 11/4/55, in 01 Initial Review Groups, DRG Archives.

105. Minutes, ECEA meeting, 11/17/54, Committees 2-7, OD Central Files; minutes, NAHC meeting, 2/25-26/55, 9-10, box 4, NIH/OD minutes file, RG 443; minutes, ECEA 3/9/56 meeting, 8/6/57 meeting, 11/6/58 meeting.

106. DRG, "Procedures Relative to the Administrative and Financial Management of Research Grants," 10/1/56, 1-2, Grants Management folder, Grants Management Branch files; minutes, ECEA meeting, 1/18/55.

107. PHS, *Annual Report*, 1956, 156-57.

108. Report, "Method of Selection of National Advisory Council and Study Section Nominees at the National Institutes of Health...", Appendix A, attached to ECEA minutes, 9/4/57 meeting: memorandum, Lindsay to Deputy Director, NIH, "Quality of Grants Review," 8/16/60, Appendix 1a, in 04 Grants 3-3, DRG Archives. The 1958 Bayne-Jones study advised that the grant system be "modified to deal more effectively with the major and more general issues of research, training, and educational policy." *Advancement of Medical Research and Education*, 62.

109. Memorandum, Allen to Director, NIH, "Classification of Extramural Staff...", 3/21/58, 03 Personnel/General, DRG Archives.

110. Lindsay, "Quality of Grants Review," Appendix X; DRG draft, "Study Section Voting Procedure," 1/17/58, 03 Meetings 3-B (Study Sections): memorandum, Allen to Surgeon General, "Revised Study Section Voting Procedures," 1/24/58, 03 Correspondence, DRG Archives. Addressing fears held by the passing leadership generation in academic medicine, Eisenhower's criteria required new projects and new programs to be (1) essential to "progress in medical discovery" and (2) free from adverse impacts on medical schools, particularly "division of manpower and other resources" and "the substitution of Federal for non-Federal sources of support." A high-level NIH survey of leading medical schools that circulated in April 1959 found that among faculty these fears had "virtually disappeared." See NIH Staff Committee on Support for Research and Training, A Study of Twenty Medical Schools (April 1959), 37.

111. Memorandum, Surgeon General to Secretary, HEW, "Presidential Criteria for Review of Research Grant Applications," 5/27/60, 04 Appropriations-2 /FY 1960 Presidential Criteria; press release, White House, 8/4/58, same file.

112. Ernest M. Allen, "Why Are Research Grant Applications Disapproved?," *Science*, 132 (November 1960), 1532-34.

113. Allen speech draft, "Medical Research Message, NIH-PHS," 1/7/59, 02 Basic Materials, DRG Archives.

114. Memorandum, Surgeon General to Secretary, HEW, "Five Year Growth Study of NIH Research Grant Programs," 2/25/60, 04 Correspondence/Office of the Secretary, HEW.

115. *DRG Digest*, 11/22/60; speech draft, "Crossroads of Research," in 05 Correspondence/"Trips - Dr. Allen," DRG Archives.

116. Memorandum, Chief, DRG to all Study Section Members, "Development of Research Program Project and Research Center Grants," 7/3/61, in 06 Correspondence/Study Section Members.

117. Daniel S. Greenberg, *The Politics of Pure Science* (New York: New American Library, 1968), 271-89. The most definitive statement of this transition in NIH policy files is the so-called "Whither Report." See ORP draft, "Development of the NIH, 1958-1970," 5/1/58, in Research 8/General, OD Central Files.

Chapter 3 Endnotes

1. Memorandum, Lindsay to Institute Directors, "Task Force to prepare a manual of PHS extramural policies and procedures," 12/11/61, Grants Management Branch files, folder 2, DRG Archives.

2. Kennedy speech text, Warm Springs, Georgia, 10/10/60, in *Freedom of Communications: Final Report of the Committee on Commerce, United States Senate, Part I: The Speech and Statements of Senator John F. Kennedy, August 1 through November 7, 1960* (Washington, DC: GPO, 1961), 1004-7.

3. Draft, J. S. Murtaugh, "Federal Support of Research: The Nature and Background of the Issues surrounding the Research Grant Program of the National Institutes of Health, PHS," 7/5/63, 11, in Research 8/Extramural (General) 1955-1969, OD Central Files. The manuscript was drafted for publication in *Science* under Dr. Shannon's signature, but was never published. Some of this material was adapted for J. Shannon, "The Advancement of Medical Research: A Twenty-year View of the Role of the National Institutes of Health," *Journal of Medical Education*, 42 (February 1967): 97-108.

4. Letter, John F. Kennedy to Lyndon B. Johnson, President of the Senate, 5/22/62, in 05 Publications, 2-1/DRG-PPO Files, DRG Archives.

5. Memorandum, Shannon to Institute Directors, "Background Information Relating to Certain Broad Grant Proposals," 6/1/60, in Referral and Review Branch historical file, Centers and Program Projects folder. See also presentation at 6/30/60 meeting of Institute Directors and discussion at 2/4/60 meeting, Committees 2-3/BID Directors, OD Central Files. In the Spring of 1961, Shannon testified, "We may be approaching the point, as happened many years ago in the large contract programs of Defense, where we have to have extramural staff to service grants locally and to minimize the number of small decisions which have to be made centrally, so that the top staff at Bethesda can be more concerned with the broad decisions than with the follow-through of their implementation."

6. Report, E. Albritten, OC/DRG Special Assistant, "Regional Office Representation for PHS Extramural Programs," 6/5/61 in 05, Office of the Director Files, DRG Archives; OC/DRG Daily Board, June 1961; memorandum, Allen to Shannon, "Large Grant Proposals," 5/20/60, 04 Legislation, DRG Archives.

7. PHS Manual, *Organizations and Functions*, 9/30/57, Sec. 7-12, in Organization Folder, Referral and Review Branch historical file; draft function statement in DRG, Office of Research Accomplishments, Compendium of Legally and Administratively Defined Missions of the Various Research Support Divisions of the Public Health Service, (November 1961), 183-86; copy in NIH Library; memorandum, Lindsay to Shannon, "DRG Responsibilities . . .," 9/14/61, 05 Authorization/8 (Established Committees).

8. Memoranda, Gordon N. Seger to Shannon, 5/2/61, OC/DRG Daily Board, May 1961, and Seger to Shannon, "Development of Research Support on a Program-Project Basis: a Status Report," 4/18/61, copy in Directives binder, H. Davidson papers.

9. DRG Memos, 61-5 (3/15/61) and 61-7 (4/16/61), DRG Directors files; Dale R. Lindsay and Ernest M. Allen, "Medical Research: Past, Present, and Future Directions," *Science*, 139 (12/22/61), 3495: 2017-24. Memorandum, Frey to Lindsay, 4/25/61, in Org 3-1/ (DRG)1962-1963, OD Central Files.

10. *DRG Digest*, 2/29/60; initialed organizational tables, 7/15/64, in Thelwell Report folder, Grants Management Branch file, DRG Archives.

11. DRG Memos, 61-4 (3/3/61) and 62-1 (11/1/61), 05 Publications 2-1; DRG, *Annual Report*, 1961, 14. Planning documents are in Building and Grounds 2/Building 31, OD Central Files. See especially notes of meeting with Bureau of the Budget representatives, 10/14/57, and memoranda, Shannon to Senator Lister Hill, 7/12/56, and Shannon to Surgeon General, 9/23/56. As redesigned in 1958, the building was intended to "provide for the consolidation in one location of the entire extramural programs of NIH." Notes of meeting on NIH General Office Building, 6/19/58.

12. *NIH Record*, 12/5/62 and 6/18/63.

13. NIH, *Annual Report of Program Activities, Division of Research Grants Calendar Year 1962*, 1; U.S. Department of Health, Education and Welfare, *The Division of Research Grants of the National Institutes of Health: Its History, Organization, and Functions, 1945-1962* (PHS Pub. 1032), 5-12.

14. DRG, *Highlights of Progress in the Division of Research Grants, 1961*, 1-2; DRG, *Administrative Report*, April-May 1961, 2. The other operating branches were Grants Management, Internal Operations, Health Research Facilities, Statistics and Analysis, Research Grants Review, and Research Grants Referral.

15. *DRG Digest*, 7/5/61. Dr. Willey was executive secretary of the Mental Health Study Section in 1957, when it was transferred from the National Institute of Mental Health to DRG and became Mental Health A.

16. Derived from organizational tables, 6/30/59-6/30/64, in folder "Thelwell Report," GMB Branch Files; NIH, Office of Administrative Management, Personnel Management Branch, *NIH Employment*, table 2.

17. Alex Adler, interview with Dr. Richard Mandel, 8/4/94. Adler, who served as DRG Information Officer from 1957 to 1967, was one of the Division's primary facilitators in the Lindsay era. Among others were Katherine Parent, Lydia Cahoon, Gilbert Frey, Drs. Edward Schwartz, and Errett Albritton.

18. Memorandum, Harold W. Curran, DRG Executive Officer, to Chief, NIH Personnel Management Branch, 5/23/60, DRG Director's files, 1962-67, Branches/2; Dr. C. Donald Larson, Executive Secretary, Physiological Chemistry Study Section, remembrance for Francis P. McGrath, *DRG Digest*, 5/19/64.

19. Memorandum, Willey to Allen, "Growing Need for Coordination of Diverse PHS Extramural Programs," 8/10/61, Lindsay-Willey, letter file, DRG Archives; report, R. Willey, "NIH Grants Management: A Prospectus," (11/18/61), 4, in Grants Management Branch file, folder 2, DRG Archives; memorandum, Lindsay to Deputy Director, NIH, 6/14/63, "Possible Delegation of 'Retail' Management Functions..."; report, Jane

Knapp, "Development of Executive Secretary Position in the Division of Research Grants," OC/DRG Daily Board, June 1961.

20. R. Willey, "Proposal for Improving Recruitment and Training of Professional Extramural Staff," 9/20/61, attached to minutes, ECEA meeting 8/5/61, in Committees 2-7, OD Central Files; memorandum, Willey to Allen, "Growing Need for Coordination of Diverse PHS Extramural Program," 8/10/61 Lindsay Reading File, DRG Archives. U.S. Congress, House Committee on Interstate and Foreign Commerce, Report No. 2266, *Investigation of HEW*, 89th Congress, 2nd Session, (Washington, DC: GPO, 1966), 111-16.

21. Memorandum, Willey to Lindsay, "Priority Items for Attention," 8/28/61, Lindsay Reading File; report, "NIH Grants Management: A Prospectus," 11/8/61, Director's Files; memorandum, Seggel to Lindsay, "Comments on Grants Management — A Prospectus, 11/8/61," 12/8/61 in DRG Director's Files, 1962-1967, Branches 2.

22. R. Willey, "A Proposal for Improving Recruitment and Training of Professional Extramural Staff," 9/26/61 Daily Board, September 1961.

23. Draft letter of appointment, November 1961 Grants Associates Board, in Directors Reading File, July-December 1961; memorandum, D. Monnier to D. Price, "Report on First Year of Operation," 9/40/63, Grants Information Office Historical File.

24. Memoranda, Willey to Allen, "Grants Associates Program," 7/25/62, and "My Continuing Concern Re Extramural Career Development at NIH," 8/3/62, Director's Reading File, January-August 1962.

25. *DRG Digest*, 9/11/62 and 9/24/63. Dr. Malone later served as Deputy NIH Director and Acting NIH Director; Dr. Brook became Associate Director for Extramural Affairs, National Institute of Arthritis, Metabolism, and Metabolic Disease.

26. Memoranda, Willey to Lindsay, "Role of DRG in the Institutional Grant Program," 7/21/61, and Lindsay to all Study Section Members, "Development of Research Program Project and Research Center Grants," 7/3/61, both in Reading File, 1961.

27. Memoranda, Shannon to Allen, Seger to Lindsay, 8/24/61, Research 8-2 Center Grants, 1959-1970, OD Central Files; Seger to Lindsay, "Review of Branch Activities...", 12/20/61, 05 Meetings/General, DRG Archives.

28. Memorandum, Willey to Seger, "Working Relationship Between SPRB and Institutes," 8/24/61, Lindsay Reading File; minutes, Special ECEA Subcommittee, 11/24/61 meeting, Committees 2-7, ECEA/1960-62, OD Central Files.

29. Memorandum, J. Palmer Saunders to Lindsay, "Program Project Applications," 5/21/63, in Referral and Review Branch history file.

30. The Division did retain the Arthritis and Metabolic Diseases Program Project Committee as a DRG study section until 1973. Interview, Dr. Harold Davidson, 12/17/93; memorandum, Samuel S. Herman to ADERT, "Initial Review of P-Series Grant Applications," 2/18/69, in Committees 2-7/Advisory Councils and Study Sections (1948-1971), OD Central Files.

31. Seiichi Yasumura, "The Research Career Award (KO6): A 20-year Perspective and Analysis of Research Productivity" (1984), 3-6; J.A. Shannon and C.Y. Kidd, "Federal Support of Research Careers," *Science*, 134 (1961):139, 1402.

32. DRG, *Annual Report*, Calendar Year 1961, 3; memorandum, Allen to ADERT, "Proposed Career Development Award Program," 3/31/60; DRG, "Informational Policy Statement on Research Career Award Program," 6/1/61, both in Directors' Files, 1962-67; letters, M. DeBakey to C.V. Kidd, 7/17/61, and Kidd to DeBakey, 8/7/61; memorandum, Kidd to Allen, 10/18/61, all in same file.

33. Memorandum, J. D. Rice to C.V. Kidd, "Differences between current employer...", 9/25/63, and memo for record, J.H. Noone, 12/3/63; memorandum, M. Wilson to B. Underwood, "RCP Conference," 12/27/63, in Research 8-8-c, Research Career Award Program/1961-1966, OD Central Files; Yasumura, 3-7.

34. "Too Much Money Given NIH, Legislators Say," *Washington Star*, 7/2/62, and "How Much is Enough?," *Washington Star*, 7/18/62, in *Star* clipping file, Martin Luther King Library, Washington, DC; memorandum for record, J. Murtaugh, 4/11/62, and memorandum, Shannon to SG Luther Terry, 4/6/62, in PPO #13, 4/20/62, 05 Publications 2/ DRG-PPO's; memorandum, Chief, Resources Analysis Section, to Director, NIH, "Observations Re grants Criticized on pp. 39-40 of Fountain Report," 6/6/61, 05 Correspondence/Inter-Governmental Relations.

35. U.S. Congress, House Committee on Government Operations, 87th Congress 2nd Session, Report #1958, *Administration of Grants by the National Institutes of Health (Re-examination of Management Deficiencies)* 6/30/62 (Washington, DC: GPO, 1962), 13-17; minutes, NIH ECEA meeting, 3/1/62, Committees 2-7. Chief Lindsay had been advised that "grant audits are far in arrears and rapidly worsening in spite of heroic efforts which have greatly improved efficiency and efficacy. Unless more qualified auditors can be attracted to the work at all levels, the claim of providing an audit will soon be completely farcial." Appendix A to "Proposal for NIH Representation in Metropolitan Centers...", DC/DRG Daily Board, May 1961.

36. R. Willey, "NIH Grants Management: A Prospectus," 11/8/61, 12-15; U.S. Congress, House Committee on Government Operations, 87th Congress 2nd Session, Hearings, *The Administration of Grants by the National Institutes of Health* (Washington, DC: GPO, 1962), 48.

37. Memorandum, Willey to Lindsay, 2/26/62, "Site Visit to Dr. Sidney Farber, February 11, 12, and 13, 1962," 2/26/62, Willey Boards.

38. Memoranda, Willey to Allen, "Grants Management," 4/5/62, and Willey to Associate Directors for Extramural Affairs and Grants Branch Chiefs, "Grants Management Seminar," 8/31/62, Willey Boards.

39. Minutes, National Advisory Council on Health Research Facilities, 4/12-13/62, 2.

40. J.S. Murtaugh, draft article, "The Federal Support of Research: The Nature and Background of the Issues Surrounding the Research Grant

Programs of the National Institutes of Health, PHS," 7/5/63, 58-69, in Research 8/Extramural (General) 1955-69, OD Central Files.

41. Memorandum, C. Miller to Members, Task Group #6-Grants Management (Final Report), 6/4/62, Grants Management Branch file; "Plan Would End NIH Research Grant Powers," *Washington Star*, 7/17/62.

42. Report, D. Price to Surgeon General, "Administrative Changes in the Public Health Service Research Grants Programs," 6/27/62, 5-6, 8, 18.

43. Report, Office of the Director, NIH, "Actions Proposed by the National Institutes of Health with Respect to the Recommendations of the Inter-Bureau Directing Committee on Research Grants Management Policy and Procedure," 7/30/62, 28, 11-14.

44. Memorandum, J.F. Yeager to Director, NIH, "Report of Task Force on Institute and Division Grants Management Functions and the Use of Staff Skills," 8/24/62, 5, Grant Management Branch file.

45. Memorandum, C. Baldwin to H. Lowe, "Communications Within the Division of Research Grants," 12/18/62, in 05 Correspondence/Research Grants.

46. Memorandum, Shannon to Terry, "Proposed Establishment of a Grant Coordinating Function...", 10/11/62, in Research 8/Extramural General (1956-69), OD Central Files.

47. Memorandum, Lindsay to Sessoms, "Central and Institute Grants Management Functions," 11/28/62; Allen to Sessoms, "Documents re: Grants Management," 11/26/62, Grants Management Branch Files, folder 2.

48. Memorandum, Surgeon General to Chiefs, PHS Bureaus, "Distribution of Research Grants Management Functions," 1/30/63, 4-6, Appendix A.

49. Memoranda, Sessoms to Shannon, "Proposed Modifications of ECEA — memo from Dr. Cummings," 5/22/63, ECEA file, Committee 2-7; Miller to Seggel and Shannon, "Enclosed Notes on Committee Management," 5/25/63, Research 8/Extramural General; *DRG Digest*, 6/18/63.

* → 50. DRG, *Report of Program Activities, January 1963 through June 30, 1964*, 37; memorandum, Seggel to Shannon, "Transfer of the Design and Analysis Section...", 11/26/63, and Kidd to Shannon, "Proposal for DRG Scientific Evaluation Activity," 10/4/63, in Organization and Management 1-2/NIH, OD Central Files. Mr. Stapp became Associate Chief for Analysis and Statistics, and his former assistant, Dr. Arley T. Bever, became Associate Chief for Research Analysis and Evaluation. SAB operating sections were relocated from scattered rental sites to the Westwood Building in the fall of 1963. This marks the onset of combined activities for the Branch. *Report of Program Activities, January 1, 1963 through June 30, 1964*, 37, 3-5.

→ 51. Memoranda, Stapp to Shannon, "Establishment of Scientific Evaluation Activity for NIH," 10/1/63, Research 9-3/DRG Scientific Evaluation (1963).

52. Memorandum, R. Seggel to A. Moore "DRG Proposal for Development of Computer Programs," 5/29/62, Research 9-3 DRG (1946-74); report, Statistics and Analysis Branch, DRG, "Scientific and Technical

Communication, DRG," January 1964, 24-25; copy supplied by Alex Adler; Arnold W. Pratt, "Computers in Biomedical Research" in DeWitt Stetten, Jr., ed., *NIH: An Account of Research in its Laboratories and Clinics* (Orlando: Academic Press, 1984), 460-66.

53. Notes, DRG staff meeting, 10/17/63. Copy supplied by Dr. Harold Davidson.

54. Statistics and Analysis Branch, "Scientific and Technical Communicators," 10-21. SAB also published the *NIH Intramural Index* beginning in 1963.

55. *DRG Annual Report, Calendar Year 1962*, 3-5; *Report of Program Activities, January 1, 1963 through June 30, 1964*, 6-8; Office of Research Analysis and Evolution, DRG, Summary Report on an Experimental Rapid Information Exchange System: The IEG Program, 1961-1967 (August 1968), 1-16, in Research Evaluation and Analysis Branch files, DRG Archives.

56. Minutes, NIH ECEA meeting, 4/23/64; DRG, *Report of Program Activities, Fiscal Year 1965*; DRG, *Report of Program Activities, January 1, 1963 through June 30, 1964*, 41.

57. DRG Information Office, "Narrative History of the Division of Research Grants," Appendix III(A) to Vol. I, Pt. 14, *Administrative History — Department of Health, Education, and Welfare*, Box 7, Johnson Library, Austin, TX; DRG, *Annual Report*, 1962, 6.

58. "A Manual to Facilitate Administration of Research and Training Grants," December 1962, Part V; "Summary of Discussions Between Medical Schools and the Public Health Service, Regional Meetings, January 14-18 of 1963," Department of Health, Education and Welfare, Public Health Service, "Grants for Research Projects: Notice of Proposed Rule Making," 42 *Federal Register* Part 52, 6/1/63.

59. "Comments on the Research Project Grant Regulations," 8/9/63, 42-43, 75e, 132-34, 136-41, 149a-154; memorandum, Lindsay to Shannon, "Report on the Effectiveness of the Research Grants Manual. . .," 6/17/63, in Grants Management Branch Files.

→60. Arnold D. Welch, "New Regulations Pertaining to Research Grants of the Public Health Service," *Science*, 141 (9/13/63): 1099-1104; J. Murtaugh draft, "The Federal Support of Research," 7/5/63, 50, 58-69.

61. Memoranda, B. Waxman to Lindsay, "Reorganization of ACCR," 2/21/62, and F. Stone to Lindsay, "Partition of programming from reviewing. . .," 2/28/62, DRG Director's File, 1962-67, Computer folder; Chief, DRFR to Director, NIH, "The ACCR and Activities of Dr. Lee Lusted, Chairman," 6/19/63, Research 9-2/DCRT 1959-1966, OD Central Files.

62. Memoranda, T. Kennedy to Chief, DRS, "DRS Proposal for short-range increase in computer capacity," 7/13/62, and Asst. Chief, DRS to Institute Directors, "Long Range Plans for Computer Capacity," 5/8/63, same file. For the problems involved in establishing a widely-dispersed computer network with this technology, see Robert S. Ledley, *Use of Computers in Biology and Medicine* (New York: McGraw-Hill, 1965), 13-15.

63. Murray D. Goldstein, interviewed by Stephen Strickland, July 1986, 7-10, HMD/NLM, acc. 464.

64. Organization tables, Thelwell Report, Grant Management File; DRG, *Report of Program Activities, Fiscal Year 1968*, ii.

65. DRG Information Office, "Narrative History of the Division of Research Grants," App IV to Vol. 1, Pt. 14.

66. DRG, *Report of Program Activities, Fiscal Year 1967*, i; memorandum, Confrey to Shannon, "Organizational Change at Section Level in the Office of the Chief, DRG," 1/27/66, Organization and Management/NIH-DRG, 1952-1981, OD Central Files.

67. *NIH Record*, "DRG Passes Its Twentieth Anniversary; Staff Grows from 5 to Today's 600," 5/3/66.

68. Memorandum, Confrey to Surgeon General Stewart, "Initial Review by PHS Institutes/Divisions Compared to DRG," 7/20/66, in Committees 2-5, "1966 Material from Files Purged," 1983-1987, OD Central Files.

69. DRG, *Administrative Report*, January 1, 1967. For effects of PHS reorganization, see W.H. Stewart, *The Mission, Organization, and Programs of the Public Health Service, Department of Health, Education, and Welfare*, submitted to House Committee on Interstate and Foreign Commerce, 3/2/67.

70. DRG, *Annual Report of Program Activities, 1966*, 1, 10; *Report of Program Activities, Fiscal Year, 1967*, 1; Confrey to Stewart, "Initial Review," 7/20/66. Committees 2-5, 1983-1987.

71. DRG Information Office, "Narrative History, 6-7, App. 1. See also E. Albritton, *National Workshop in Bioengineering Research and Manpower* (1965).

72. James H. Cassedy, "The Stimulation of Health Research: Catalytic Activities of PHS Study Sections, 1946-1962," 22, att. to Confrey, memorandum, "Scientific Program Evaluation at NIH: A Proposal to Establish an Activity in DRG," Research 9-3/DRG, 1946-74. For the 19th Century context, see John S. Haller, *Medical Protestants: The Eclectics in American Medicine, 1828-1839* (Carbondale, IL: Southern Illinois University Press, 1994), 48-60.

73. Memoranda, Research Grants Review Branch to Exec. Secs., "Project Site Visits," 7/22/63, S/E Grant File, General File, courtesy of Dr. John James; Financial Management Officer, NIH to Administrative Officer, DRG "Scientific Evaluation Grants-Study Section," 6/10/63; letter, Shannon to Rep. Daddario, 2/23/67, Committees 2-7/Advisory Councils and Study Sections. Memoranda, M. Cummings to T. Bowery, "Chairman's Grants Study," 8/29/63; T. Bowery to M. Cummings, 9/18/63, in Research 9-3/DRG-Scientific Evaluation Group; Confrey to All Executive Secretaries, "Clearance of Consultants," 12/18/63, DRG Staff Meeting File.

74. Review of Bowery report, "Reimbursement of Committee Members," n.d., Grants Management Branch File, Chairman's Grants folder; memorandum, to DRG Administrative Officer, "Scientific Evaluation Grants - Study Sections," 6/10/63, in Research 9-3 DRG/Scientific Evaluation Group; memorandum, T. Bowery to R. Seggel, "Status Report on Study of Scientific Evaluation Grants...", 12/10/63, Grants Management file, Referral and Review Branch File.

75. Memorandum, Seggel to Shannon, "Legislative Relief on Chairman Grants Problem," 3/27/67, and 2/1/67 draft, "Chairman Grants," attached to Jolliffe to Seggel, 2/1/67; Carolyn B. Casper to Richard Seggel, "Chairman Grants," 4/17/67, in Research 8-1-B/Chairman Grants, OD Central Files. The Casper study recommended changing to a mail review system and eliminating the position of study section chairman.

76. DRG, "Narrative History," 13; memorandum, J. Sherman to S. Sessoms, "Substitute for Terminated K-6 Program," 6/15/65, Research 8-8-c/Research Career Award Program; "NIH: Moratorium on Career Awards for Researchers Called for Blend of Budgetary and Policy Reasons," *Science*, 145: 3638 (9/18/64), 1283-84.

77. Report, "Review and Evaluation of Special Program Awards," 10/3/67, in Information Office historical file.

78. Memorandum, J. Sherman to J. Shannon, "Review and Evaluation of Special Program Awards," 11/20/67, in Research 9-3 DRG/1946-79.

79. Minutes, NIH ECEA meeting, 7/2/64, 1 and attachment 1, in Committees 2-7/ECEA, 1963-1964, OD Central Files; memoranda, D. Price, Deputy Surgeon General, to Bureau Chiefs and Director, NLM, "Civil Rights Forms and Procedures," 12/16/64; and Confrey to Extramural Program Staff, "Procedure for withholding payment on awards...", 12/30/64, DRG Directors' Files; DRG, *Annual Report*, FY 1965, 2.

80. Memoranda, Dr. Robert B. Livingston to J. Shannon, "Progress Report on Survey of Moral and Ethical Aspects of Clinical Investigations," 11/4/64; Shannon to Surgeon General, "Moral and Ethical Aspects of Clinical Investigations," 1/7/65, RRB/RGRB-Review Procedures; minutes, Executive Committee, Research Grants Review Branch, 2/24/66, in RRB/Minutes; Eugene A. Confrey, "PHS Grant-Supported Research with Human Subjects," *PHS Reports*, 83 (February 1968), 130.

81. DRG, *Annual Report*, FY 1967, 1-2.

82. Speech text, "Research and Ethics," 10/7/67, courtesy of Eugene Confrey; DRG Administrative Report, April 1968, 3-4; DRG, *Annual Report*, FY 1968, 1, 9.

83. Report, Steering Committee for Data Processing Requirements at the National Institutes of Health, "Computing and Data Processing at the National Institutes of Health: A Five-Year Projection," April 1963, 3-5, 18-19, 109-12, in Research 9-2 DCRT/1959-66; memorandum, P. Stapp to Drs. Confrey, Sherman, and Leavitt, "Thoughts on the Organization of an Extramural General/Administration and Management," 1968, OD Central Files.

84. Minutes, NIH ECEA meeting 4/23/64; DRG *Report of Program Activities, Fiscal Year 1965*, 43-47. January 1965 also marks the first production of magnetic tape with grant descriptions for the Research Documentation Section, SAB. DRG staff meeting notes, 1/14/65, H. Davidson papers.

85. Memorandum, E. Confrey to Institute Directors, "Extramural Data Processing System," 3/17/64, in Research 9-3 DRG/1946-74; *DRG Digest*, 6/2/64, 2-3.

86. Memoranda, P. Stapp to E. Confrey, "Computer Configuration," 5/12/65, and J. King to R. Seggel, "Stapp Memorandum," 5/13/65, Research 9-2, DCRT/1959-66.

87. DRG, *Report of Program Activities, Fiscal Year 1967*, 22-24, 31-33; *Report of Program Activities, Fiscal Year 1968*, 22-24.

88. Memorandum, P. Stapp to J. Shannon, "Separate (NIH Scientific and DRG) Administrative Data Processing Computer and Support Personnel," 6/17/66; report, "FMB-DCRT Study for the Development of a Total Financial Management Information System," 6/6/67, in Research 9-2 DCRT 1959-66; memorandum, Shannon to Surgeon General, "Division of Research Grants," 3/10/66, in Research 9-3 DRG/1946-74.

89. Rufus E. Miles, *The Department of Health, Education, and Welfare* (New York: Praeger, 1974), 46-54; HEW, "Study of Organization of the Office of the Surgeon General," May 1966, (Deckard Report), 2-3, Referral and Review Branch F.6; "Medical Research: NIH Wants Divorce from PHS," *Science*, 156 (4/7/67).

90. Memorandum, S. Bress to S. Hatchett, "GMB's proposal for automating the grant history record," 2/17/67, in GMB file, DRG Archives; DRG *Annual Report, Fiscal Year 1969*, 7-8.

91. Memorandum, J. Hanlon to Director, NIH, "Grants Operations Services from NIH," 9/6/68, in Research 9-3 DRG/1946-74. For the background of this slowly unfolding decision, see memoranda, Allen to Confrey, "Extension of Delegation of Responsibilities for receipt and referral...", 10/20/67; Schiaffino to Confrey, "Memorandum from Director...", 2/14/67; and Allen to Bureau Chiefs, "Delegation of Responsibilities...", 2/3/67, in organization folder, Referral and Review Branch files.

92. Memoranda, T. Bowery to ADERT, "The DRG and Institute Role in NIH Extramural Program Development," 3/17/64, in Research 8/Extramural (General), 1968-1969; Director, NIH to Surgeon General, "NIH Staff Document, 'Program Development' and the Use of NIH Advisory Councils," 10/19/64, in Committees 2-7/Advisory Councils and Study Sections (1948-1971), OD Central Files.

93. Memoranda, Surgeon General to Bureau Chiefs and Staff, "Dual Review of Research Project Grants," 11/8/61, in Referral and Review Branch historical files, Review Procedures folder; Chief, DRG to Director, NIH, "Proposed Redesignation of Certain Research Grants as Special Grants with Modified Review Procedures," 10/2/59, in 04 Correspondence/NIH Director, 1959-1960, DRG Archives. The separation of program and reviews had begun in 1959, with the transfer of the psychopharmacology grant program from NIMH to DRG. For Shannon's decision, see memorandum, E. Allen to R. Seggel, "Transfer of the Mental Health Psychopharmacology Review Committee into the Division of Research Grants," 7/9/59, in 04 Correspondence/NIH Executive Officer.

94. DRG Policy and Procedure Office, PPO Circulars #15, "Procedure for Review of Special Grants," 4/26/62; #47, "Preliminary Review of Research Grant Applications," second draft (11/27/62); #46, "Reissue of Guidelines for Dual Review of Research Project Grants," 9/28/62, in 05 Publications/PPO folder, DRG Archives.

95. J. Murtaugh, memorandum for record, "Discussion with Bureau of the Budget Representatives on Fountain Committee Hearings," 4/11/62, same file; OD draft, "Supported Methods of Operation of National Advisory Councils," 10/31/62, attached to agenda, Institute Directors' meeting, 11/1/62, in Committees 2-3/BID Directors 1961-1962, OD Central Files.

96. Memorandum, Seger to Allen, "Observations on Review Procedures," 11/24/61, Review Procedures folder, Referral and Review Branch historical files. See also Seger to Shannon, "Development of Support on a Program-Project Basis - A Status Report," 4/18/61, directives binder, H. Davidson papers.

97. Memoranda, F. Stone to J. Shannon, "The ACCR and Activities of Dr. Lee Lusted, Chairman," 6/19/63, 2, in Research 9-2 DCRT/1959-1966; F. Stone to D. Lindsay, "The partitioning of programming from reviewing responsibilities ...," 2/28/62, in DRG Directors files, 1962-1967/Computer file.

98. E. Confrey, transcript, Remarks at Meeting of Representatives of Initial Review Groups, Clinical Center, 8/23/66, 5-6; NIH Almanac, 1968, 73; Derek J. De Solla Price, *Little Science, Big Science* (New York: Columbia University Press, 1963), 93-115.

99. Charles Miller, draft, OPP background paper, "Administrative Problem Areas," 2/26/64, in Grants Management Branch/folder 2, RRB files.

100. OPP background paper, "Notes on Future Directions in Biomedical Research and their Implications," 7/14/67, In Program Planning 3/Secretary's Advisory Committee on the future of NIH, OD Central Files.

101. John Sherman, interview with Richard Mandel, 4/21/95; *Biomedical Science and Its Administration: A Study of the National Institutes of Health* (Washington, DC: the White House, 1965), 10-17, 109-13, 192-202; J.D. Cooper, "Onward the Management of Science: the Wooldridge Report," *Science*, 148: 3676 (6/11/65), 1433-39.

102. W. Henry Lambright, *Presidential Management of Science and Technology: The Johnson Presidency* (Austin, TX: University of Texas, 1985), 108-11; D.S. Greenberg, "LBJ Directive: He Says Spread the Research Money," *Science*, 149: 3691 (9/25/65) 1483-85.

103. *Biomedical Science and Its Administration*, 40-42, 192-202, 205-7. The Committee recommended that executive secretaries forego their traditional neutrality and play active roles in negotiating with investigators and interacting with Institute staff.

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82. Memoranda, C. Edwards to C. Weinberger, "The Peer Review System of the NIH/NIMH - Summary," 5/16/73, and C. Weinberger for F. Carlucci and C. Edwards, "Peer Review System," 6/4/73; Secretary Weinberger, text of remarks to Assembly of Scientists, NIH Clinical Center, 7/9/73, all in Committees 2-1/Advisory Committees and Study Sections (1973); "Secretary Praises NIH; Announces Training Program," *NIH Record*, 25 (7/17/73) 1, 8.

83. Notes, Dr. William Goldwater, "Implementation of R2, Cooper Committee Report, Critique of Comments on R2 by B/I/Ds," 3/30/73, Box 7, Cooper Committee Report folder, Goldwater papers. Dr. Goldwater was the Cooper Committee's Executive Secretary. See also D. Parker to W. Raub, 7/12/73, 7/24/73, 7/30/73, Box 6, Program Mechanisms Recommendations folder.

84. Memoranda, Dr. Carl Douglass, DRG Deputy Director, to J. Sherman, Acting Director, NIH, "DRG Comments on the Report of the NIH Program Mechanisms Committee," 3/6/73, and Dr. Stephen Hatchett, DRG Director, to Acting Director, NIH, "Preliminary Comments on NIH Program Mechanisms Committee Report," 2/28/73, in Referral and Review Branch Files, Cooper Report folder; C. Douglass to W. Raub, 6/29/73, Goldwater papers; memorandum, Douglass to Chairman, Working Group on Projects, "Comment on Final Report," 8/15/73, Research 9-3/DRG (1946-1976), OD Central Files.

85. Robert S. Stone, "Status and Trends of the NIH Research Support Program," 11/4/73, 15-17; memorandum, Director, NIH, to Directors, B/I/Ds, "Decision Regarding Implementation of Recommendation 2b (Projects) on NIH Program Mechanisms Committee," 6/7/74, box 7 Goldwater papers; "Report of Working Group On Projects, Recommendations #2," 11/9/73, 2-6 and Attachment B, in Research 9-3/DRG (1946-1974) folder.

86. Gerson Fishbein, "The Seige of NIH," *Washingtonian* (March 1974), 77, 138-39.

87. Report of the ECEA Planning Committee, ECEA Seminar on Peer Review, February 25-27, 1974, n.d., 1, 5-7, in Referral and Review Branch Files, Peer Review (1972-1974) folder.

88. ECEA Seminar on Peer Review, Reports from Panel A, Panel B, and Panel C; Dr. Samuel M. Schwartz, "The Centralized Review Process," same file.

89. Minutes, ECEA meetings. 6/12/74, 3, and 10/9/74, 2; memorandum, ADERT to Director, NIH, "Proposed Actions Related to Grants Peer Review; the ECEA Seminar on Peer Review," 12/12/74, in Research 8-1-h/Peer Review (1949-1974), OD Central Files.

90. Memoranda, A. Kaufman to Workshop Planning Committee, "Notes from Meeting on January 10, 1975," 3; R. Lamont-Havers to B/I/D Directors, "Establishment of the NIH Grants Review Study Team," 4/28/75; Report, President's Biomedical Research Panel, "Disclosure of Research Information," 6/30/75; C. McCarthy, Division of Legislative Analysis, summary of hearings, House of Science and Technology Subcommittee (Rep. J. Symington, chair), 7/22/75, all in Research 8-1-h/Peer Review (1974-1976), OD Central Files.

91. PHS Grants Policy Memo #7, 12/31/74; memorandum, J. Green to A. Kaufman, "Policy on Objective Review of Grant Applications," 5/7/75, same file; minutes, B/I/D Directors meeting, 7/8/75, and ECEA meeting 9/10/75, in Committees 2-7/ECEA (1973-1975).

92. Memorandum, GPRST chair to Director, NIH, "Interim Report," 9/11/75, in Research 8-1-h/Peer Review (1974-1976).

93. GPRST, "Interim Report," 9/11/75; DRG, Administrative Report, September 1975; GPRST, *Report to the Director, NIH* Phase I, vol. I (December 1976), 3-6, Attachment 1. The last comprehensive survey of the extramural system, the Woolridge Committee Report of 1965, had no NIH or PHS personnel on staff. The Bayne-Jones Report of 1958 was written by consultants, drawn from outside documents 19 and 25, same file.

94. Memorandum, NIH Grants Peer Review Study Team to Director, NIH, "Status of the NIH Grants Peer Review Study," 7/6/76; GPRST, *Report to the Director, NIH*, Phase I, xix-xxv, 3-7, 51-57, 116, 119, 123-25, 129-36, 189-99.

95. DHEW, Decisions by Director, NIH, on Recommendations of Grants Peer Review Study Team (2/8/78), 1-3; Comptroller General of the U.S., Report to Congress, *Better Controls Needed Over Biomedical Research Supported by the National Institutes of Health* (7/22/76), 12-16, 19-20.

96. GPRST, *Report to the Director*, Phase I vol I, 58, 45. Additional evidence of peer review adequacy was Grace M. Carter, Peer Review Citations, and Biomedical Research Policy: NIH Grants to Medical School Faculty, Rand Report R-1583-HEW, December 1974, which utilized IMPAC data and was prepared with the assistance of the Statistics and Analysis Branch, DRG. See also Thane Gustafson, "The Controversy over Peer Review," *Science*, 190 (12/12/75): 1060-65.

97. Memoranda, A. Kaufman to ESRAC members, "Notes From ESRAC Meeting on May 13, 1976"; A. Kaufman to R. Lamont-Havers, "ESRAC

Recommendations from Extramural-Collaborative Retreat," 7/7/76; R. Lamont-Havers to ESRAC, "Response to ESRAC Recommendations," 8/10/76, all in Research 8-1-h/Peer Review (1974-1976).

98. GPRST, *Report to the Director, Phase I*. 45-46. By detaching initial reviewers from program management, an Institute could prevent "even the most well-intentioned" administrator from skewing the evaluation of proposals when he "authors a Request for Application, selects the consultants to review the responses, chairs the review meeting, tallies the votes, writes the summary statements, selects the applications to be awarded, and serves as the program administrator." "Such situations," the Report concluded, "must be prevented."

99. *Report of the NIH Program Mechanisms Committee*, 7; memorandum, Associate Director for Review, NHLBI, to Director, NHLBI, to Director, NHLBI "Review Policy Statements," 11/23/23/76, in DRG/Director's Files/Peer Review.

100. PHS, *Grants Administration Manual*, Chapter 1-507 circulated as PHS Grants Policy Memo #7, 12/31/74; NIH, *Instruction and Information Memorandum 82-4*, 11/8/82; memorandum, Research Grants Officer to Coordinating Committee on Program Mechanisms, "Notes from the Meeting. . . November 25, 1974," 12/9/74, in Research 8-1/Report of the NIH/PRC, 1974-1976, OD Central Files.

101. President's Biomedical Research Panel, *Program-Project and Center Grants as Instruments for Funding Biomedical and Behavioral Research* (October 1975), 4-5; Bruce M. Carter, Clara S. Lai, Carolyn L. Lee, *A Comparison of Large Grants and Research Project Grants Awarded by the National Institutes of Health* (Santa Monica: Rand Corporation, 1978) 1-3, 21-23.

Chapter 5 Endnotes

1. W.F. Raub, "NIH Extramural Programs: Strategy for Fiscal Year 1983 and Beyond," 7/26/82, in Research 8 Extramural (General) 1974-1982, OD Central Files.

2. DRG *Annual Report*, Fiscal Year 1974,i; DRG Briefing Book, 4/5/79, pt. I chart 5, in Research 9-3/DRG 1976-82.

3. Editorial, "Things have changed between Science and Government," *FASEB Newsletter*, 12 (June 1979); *Congress and the Nation* VI: 601-603; Eli Ginzberg and Anna B. Dutka, *The Financing of Biomedical Research* (Baltimore: Johns Hopkins University Press, 1989) 24-28.

4. DRG, "Extramural Trends Presentation," 2/1/83, in DRG 1 IMPAC System/CRISP System, OD Central Files; D. H. Osmond, "Malice's Wonderland: Research Funding and Peer Review," *Journal of Neurobiology*, 14 (1983): 95-112.

5. "Resignations Renew Call for Federal Health Dept.," *Medical Tribune* (1/15/75); Richard L. Seggel, *Organizational Roles of the Public Health Service Commissioned Corps and Surgeon General*, 19-21.

6. Agenda Meeting, Intercouncil Representatives, 7/16/75, in Fredrickson File, Minutes - 1975/folder 3, box 2, RG 443, National Archives.

7. Daniel M. Fox, *Power and Illness: The Failure and Future of American Health Policy* (Berkeley: University of California Press, 1993), 84-93, 101-107; U.S. Congress, House Committee on Standards of Official Conduct, *In the Matter of Representative Daniel J. Flood*, Report 96-856, 96th Congress, 2nd Session, 3/26/80, 5-16; "8-Volume of Hearings That Were Never Held is Published, With Full Quotations," *New York Times*, 10/4/76. The incident costs Mr. Dirks his position.

8. Arthur M. Silvestein, *Pure Politics and Impure Science: The Swine Flu Affair* (Baltimore: The Johns Hopkins University Press, 1981), 120-142; William Broad and Nicholas Wade, *Betrayers of the Truth* (New York: Simon and Schuster, 1983), 11-21.

9. DRG, *Administrative Report*, February 1978, 5; U.S. Congress, House Committee on Interstate and Foreign Commerce; Subcommittee on Health and Foreign Commerce, Subcommittee on Health and the Environment, *Investigation of the National Institutes of Health*, 94th Congress, 2nd Session, August 1976, 4-5, 43-44, 50-51. The report, informally named for Dr. H. Daniel Banta, the lead staff investigator, is in Program Planning 3/1976, OD Central Files. A more detailed version circulated as a GAO Report, *Better Controls Needed Over Biomedical Research Supported by the NIH*, July 1976, in Research (General)/1975-1977.

10. "Kennedy Bill Maps Sweeping Changes at NIH," *Blue Sheet*, 22:17 (4/25/79), 1-2; "NIH Asks, Congress Gives: 'Those Days are Past' says Senator Kennedy...", *Blue Sheet*, 22:18 (5/2/79), 1, 3-4; Don K. Price, "Endless Frontier or Bureaucratic Morass?" *Daedalus*, 107 (Spring 1978), 81-91; report, Office of the Director, NIH, "Organization Study of Extramural Activities in the Office of the Director, NIH," by Joan P. Porter and George F. Russell, December 1977, 20-21, 32-33; quotation from 6-7. Copy in DRG 1969-1978 folder, Office of Management Resources Files.

11. *American Men and Women of Science* (17th edition, vol. 2), 1189. Prior to 1969, NIH regulations allowed intramural scientists to serve as study section members.

12. "Dr. Fredrickson's Notes for an Inaugural Address," in minutes, BID Directors Meeting, 7/1/75, Committees 2-3; statement before Subcommittee on Health, Committee on Labor and Public Welfare, U.S. Senate, 6/17/76, in NIH, OD, *Speeches, Articles, and Selected Papers* by Donald S. Fredrickson, 1975-1981 vol. I, document 26, 5-6; D.S. Fredrickson, "Health and the Search for New Knowledge," *ibid*, I/6: 162-170; minutes, ECEA special meeting, 7/29/76, 1-5, in Committees 2-7, OD Central Files; minutes, Director's Advisory Committee meeting, 6/16/78, Committees 2-4.

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15. Institute of Medicine, *Review of DHEW's Research Planning Principles* March 1979 (Washington, DC: National Academy of Science), 78-79, 8-12; letter, D. Fredrickson to Dr. David A. Hamburg 3/21/79, in Program Planning (General)/HEW Health Research Principles 1979-81, folder #3, OD Central Files.

16. Fredrickson commentary, in Proceedings of the 1979 Meetings of the Chairpersons of NIH Scientific Review Group, 5.

17. Memorandum, A. Kaufman to Members, Coordinating Committee on Program Mechanisms, "Notes from Meeting of CCPM, 10/23/74," 10/29/74, in Research 8-1/Report of the NIH Peer Review Committee 1974-76, OD Central Files; memorandum, ADERT to Director, DRG, 6/28/74, in Research 8-1/Report of the NIH/PRC, 1974-1996.

18. DRG, Administrative Report, October 1976, 1; Dr. Carl Douglass, interview with Richard Mandel, 10/25/94.

19. Memorandum, Fredrickson to Douglass, "Research Plan Review Session," 6/18/80, Referral and Review Branch historical files; briefing paper for Assistant Secretary for Health, "The NIH Peer Review System," 3/2/83, charts 3 and 4, in Committees 2-8-L/Peer Review System.

20. Dr. S. Stephen Schiaffino, interview with Richard Mandel, 5/25/94; minutes, EPMC meeting, 4/8/81, 1, in Committees 2-24.

21. DRG, Administrative Report, October 1977, 6; briefing paper, "NIH Peer Review System," 3/2/83, Chart 3.

22. Memorandum, Fredrickson to Douglass, "Research Plan Review Session," 6/18/80; "Maintenance Level is Carter's HEW Budget Aim," *Blue Sheet*, 20:21 (5/25/77), 9.

23. "Task Force Study of NIH Central Service Activities" 10/1/76, att. II-5, in Budget - NIH Management fund study, DRG Executive Officer's Files; briefing paper, "NIH Peer Review System," Chart 3; *Blue Sheet*, 21:28 (7/12/78), 9; memorandum, Douglass to Fredrickson, "Alternatives for Handling Increases in Study Section Workload," 6/13/77, in Committees 2-25/RPC 1983-87, OD Central Files.

24. Memorandum, G. Jarboe to C. Douglass, "Still More on Workload/Personnel Statistics," 6/20/79, in Research 9-3/DRG; NIH, *Basic Data Relating to the National Institutes of Health*, 1979, 46.

25. Association of American Medical Colleges, "The integrity of the Peer Review System as used at the National Institutes of Health," attached to memorandum 78-33 by Dr. J.A. Cooper, 5/15/78, 3-5; memorandum, J. Richmond, Assistant Secretary for Health to K. Bruto, Deputy Executive Secretary, DHEW, "NIH Peer Review Panels: Workload of Study Sections," 2/29/80, 1-6, in Referral and Review Branch Historical Files; NIH/DRG, Proceedings of the 1979 Meeting of the Chairpersons of NIH Scientific Review Groups, 59-65.

26. S. Cole, L. Rubin, and J. Cole, "Peer Review and the Support of Science," *Scientific American*, 237:4 (October 1977), 41. See also Stuart

Bondurant, "Peer Review of Research Grants by NIH Study Sections," *Clinical Research*, 25 (December 1977); *Chronicle of Higher Education*, 2/27/78, 5; editorial, "The Burden of Competitive Grants," *Science*, 203: 4381 (2/16/79), 1.

27. Memorandum, Douglass to Fredrickson, "Alternatives for Handling Increases in Study Section Workload," 6/13/77, Committees 2-25/RPC, 1983-1987, OD Central Files; Grants Peer Review Study Team, *Report to the Director, NIH*, Phase I December 1976, 130-32.

28. Minutes, ECEA meeting 2/8/78; "Flexible Study Sections' Proposal First Sign of Change in NIH Peer Review," *Blue Sheet*, 21:14 (4/5/78), 6; report, T. Malone, Deputy Director, NIH, to Senate Committee on Appropriations, "Number and Size of NIH Peer Review Panels," December 1979, Referral And Review Branch historical files.

29. DRG, *Administrative Report*, June 1979. Five additional study sections were requested in May. See memorandum, Fredrickson to Assistant Secretary for Health, "Request to Establish Five New Study Sections," 5/17/79, in Referral and Review Branch historical files, Planning for New Study Sections folder. Also Director, NIH to BID Directors, "NIH Instruction and Information Memorandum," #OD 78-2, 6/1/78, and *Federal Register*, 43: 38 (2/24/78), 7862-66, both in Peer Review 1977-1978 folder, same file.

30. Thomas F. Malone, report, "Number and Size of NIH Peer Review Panels," 4-5; list of initial review groups, October 1979, attached to letter, M. Oakleaf, FOIA Coordinator, to I. Bress, 4/29/80, in peer review file, Referral and Review Branch historical files.

31. Information from Dr. Mischa Friedman, Chief, Referral and Review Branch, 1984-1988. Secretary Califano's successor, Patricia R. Harris, issued eight charters in January 1981, shortly before the Carter Administration left office. DRG, *Administrative Report* (February 1981), 6.

32. OD/NIH, Report, "Number and Size of NIH Peer Review Panels: A Report to the Senate Committee on Appropriations," 11/29/79 SRB Folder, RRB Files; memorandum, J. Richmond to K. Buto, 2/29/80, Chart B. Branch policy was that "no reviewer should be assigned more than 10 or 12 applications" per day, and that no meeting should last more than three days. Minutes, Executive Secretaries Meeting, 3/26/80, Referral and Review Branch Files. Actual workloads usually exceeded 75 reviews per meeting. For the three meetings in 1978, the percentage of DRG study sections reporting 75 or fewer reviews was 8 percent, 30 percent, and 18 percent. The 50 sections averaged 105.9 reviews per meeting. Scientific Review Branch draft study, "NIH Scientific Review Groups," 5/4/79, in folder Peer Review 1977-1978.

33. Memoranda, S. Bress, N.D., att. ECEA minutes, 9/15/77; Fredrickson to Douglass, 6/18/80; Chief, OPPE/PPB, to OD staff, "DRG Program Review Session," 6/3/81, attached list 1980 accomplishments, in Research 9-3 DRG/1976-82; DRG, *Administrative Report*, FY 1980, 19-20.

34. Memoranda, S. Schiaffino to SRB, "Supervisory Responsibilities," 4/9/76, and "Reorganization of SRB," 10/21/76, in folder Schiaffino

Memos, Referral and Review Branch historical files; DRG *Annual Report*, 1976, 21. Dr. Katherine S. Wilson was appointed Assistant Chief for Biomedical Sciences, Dr. Misha E. Friedman was appointed Assistant for Clinical Sciences, and Dr. Irving Simos was appointed Assistant Chief for Social and Behavioral Sciences. Their respective Lead Grant Assistants were K. Elizabeth Rainer, Carol L. Tippery, and Jean Malcolm.

35. Interviews, S. Schiaffino, 5/25/94 and S. Schwartz, 7/28/95. There was also considerable turnover within Executive Secretary ranks. Of 75 on board in 1979, 42 had come to DRG after January 1976. Memorandum, Sharon Porter to DRG Executive Officers, "Comparison of FY 76-79 and FY 80-83 Statistics on DRG Health Scientist Administrators in Referral and Review," 2/23/84, in folder Personnel 17/Health Science Administrator, Referral and Review Branch historical files.

36. Minutes, Executive Secretaries Meetings, 2/6/79, 5/17/79, and 8/9/79, in folder Schwartz Memos, RRB historical files; memorandum, S. Schwartz to C. Douglass, "Central Support Services for Scientific Review Branch," in April 1982. See Schwartz to RB/SRB Staff, 4/26/82, in Schwartz Memos folder.

37. Memorandum, Director, DRG to Associate Director for Scientific Review, "Reorganization within the Scientific Review Branch," 7/1/81, in folder O and F Functional Statements, same file. Dr. Raymond Bahr was named Assistant Chief for Biochemical Sciences, Dr. Halvor Aaslestad was named Assistant Chief for Physiological Sciences, and Dr. Miriam Keltz was appointed Assistant Chief for Behavioral and Neurosciences. Their respective Lead Grants Assistants were Virginia Shifflett, Margret Ganley, and Patricia Hoff.

38. Memorandum, DRG Executive Officer to Director, Division of Management Policy, "Notification of Organization Change in the Division of Research Grants," 1/28/80, in Organization and Management 1-2/DRG (1982-1981), OD Central Files; DRG, *Annual Report*, 1979, 15; memoranda, S. Schwartz to Study Section Offices, "Distribution of Study Section Material," 7/7/82, both in Schwartz Memos folder, RRB historical files.

39. Minutes, DRG Executive Secretaries Meetings, 9/29/82, 4-5, and 2/6/79, 1; in Minutes files, memoranda, S. Schiaffino to Associate Director for Extramural Activities Program, NIAMDD, "Inappropriate Request by Staff Member," 3/22/78; S. Schiaffino to ECEA, "Services and Accommodations provided by Study Section Staff," 10/25/78, in folder Schiaffino Memos, RRB historical files; Proceedings of the 1981 Meetings of the Chairpersons of the NIH Scientific Review Groups, 11-17.

40. Schiaffino interview, 5/25/94; Schwartz interview, 7/28/95; minutes, DRG Executive Secretaries Meeting, 9/30/80, 3-4; memoranda, Associate Director for Scientific Review to SRB staff, "Performance Appraisal Committees for FY 82," 8/28/81, and "Merit Pay Results," 10/7/81, in folder Schwartz Memos, RRB historical files.

41. Proceedings of the 1982 Meetings of the Chairpersons of NIH Scientific Review Groups, 14-17; 74-76; memorandum, P. Lenz to EPMC, "Public Invitation to Provide Suggestions for Reducing the Administrative

Burden on Principal Investigators," 9/2/81, attached to EPMC minutes, 9/9/81, attached to EPMC minutes, 9/9/81, in Committees 2-7, OD Central Files.

42. Editorial, "Peer Review Reviewed," *Science*, 4/8/77; Thane Gustavson, "The Controversy over Peer Review," *Science*, 190 (12/14/75): 1060-66.

43. *NIH Extramural Trends*, FY 1979-1988, 31; briefing paper, "NIH Peer Review System," 3/2/83, chart 6; issue paper, "Release of Summary Statements and Other Documents Associated with Initial Review," 6/11/80, Referral and Review Branch historical file; *Chronicle of Higher Education*, 2/27/78, 5. Lewis Thomas, President, Memorial Sloan-Kettering Cancer Center, testified at a House Health Subcommittee hearing on November 14, 1977: "The NIH study sections and review branches have become much more conservative than ever before in my memory, and they tend to make awards only for projects that seem 'safe and sound.' The sort of gambling on imaginative ideas that must, in the nature of things, carry a high probability of not turning out as predicted in the end, is no longer the driving force in basic research that it was during the productive '50's and '60's." *Blue Sheet*, 22:48 (11/28/79), 4.

44. Report to the House Committee on Appropriations, "NIH Support of New Investigators and Unconventional Ideas," 9/20/79, Referral and Review Branch historical file; D. Chubin and M. Krazenberg, "Peer Review Reconsidered," *Grants Magazine*, 6:4 (December 1983), 253-54; minutes, ECEA meeting, 10/31/79, 3.

45. Report, "NIH Study Section Ratings: Scientific Merit or Order of Payment?," J. Saunders and M. Gordon (1965), 3-4, 9-10; "Information to Supplement Priority Scores (Revised)" (1970), Referral and Review Branch historical files.

46. Report of ECEA Subcommittee to Examine "Normalization" of Priority Scores, 4/16/71; memorandum, C. Douglass, "Normalization of Priority Scores," 11/2/71; memorandum, S. Schiaffino to R. Lamont-Havers, "Report of the Normalization Evaluation Committee," 5/24/73, in Research 8-1-i/Priority Scores 1961-1982.

47. Paper, "Rating Scores and Approval Rates: Some Preliminary Considerations," C.J. Scheirer, Grants Associate (March 1980), Referral and Review Branch historical files; Phase I Final Report, NIH Committee to Study Priority Scores (Dalton Committee Report), February 1979, in Research 8-1-i/Priority Scores, 1961-1982, OD Central Files.

48. Memoranda, J. Green to W. Raub, "Priority Scores: Raw or Normalized?," 1/21/80; W. Raub to D. Fredrickson, same subject, 1/7/80; W. Moss to T. Malone, "Priority Scores," 10/1/79, Research 8-1-i/Priority Scores 1961-82.

49. "NIH Peer Review System Locks Out Nutrition Research, McGovern Charges...," *Blue Sheet*, 22:40 (10/3/79), 16-17.

50. Memorandum, Director, NIH to BID Directors; "NIH-Wide Convention for Representing Priority Scores," 1/22/80, Research 8-1-i/Priority Scores 1961-82. The usage "BID" refers to NIH operational units and includes Bureaus, Institutes, and Divisions.

51. Minutes, DRG Executive Secretaries meeting, 9/30/80, Referral and Review Branch historical files.

52. "NIH Peer Review Expansion to Include Non-Scientists...", *Blue Sheet*, 23:26 (6/25/80), 12; *Congressional Record*, 4/1/80, 5, 3380-31; *Congress and the Nation*, V 652-53; K. Burke to W. Raub, 10/19/79, and letter, J. Wyngaarden to Rep. H. Waxman, 8/6/82, Research 8-1-h/Peer Review 1978-83, OD Central Files.

53. Howard J. Sanders, "Peer Review-How Well is it Working?," *Chemical and Engineering News*, 3/15/82, 32-42; *Blue Sheet*, (12/9/81) 12-13; transcript, President's Cancer Panel, first regional meeting, Boston, 3/29/82, attached to minutes, Extramural Program Management Committee (EPMC) meeting, 5/12/82.

54. Release of Summary Statements and Other Documents Associated with Initial Review," 4/21/80, attached to minutes, EPMC meeting, 7/30/80. ECEA was reorganized as EPMC effective October 1, 1979, and its minutes are in the same file. For the Division's perspective on the changing NIH mission, see minutes, DRG Executive Secretaries Meeting, 9/29/82, 4-5, Executive Secretaries Minutes folder, RRB historical files.

55. Memorandum, Director, DRG to Director, NIH, "Increase in Workload and Personnel Ceiling," 10/23/79, in Research 9-3/DRG 1976-1982, OD Central Files.

56. Minutes, EPMC meeting, 4/21/82; memoranda, Schiaffino to Executive Secretaries, SRB, NIH Manual Issuance 4206-Care and Treatment of Laboratory Animals," 4/27/77; Schiaffino to Executive Secretaries, SRB, "Recombinant DNA Research Interim Guidelines," 10/21/76, in Schiaffino folder; minutes, Executive Secretaries Meeting, 8/29/79, 6, Schwartz Memos folder.

57. Institute of Medicine, *Responding to Health Needs and Scientific Opportunity: The Organizational Structure of the National Institutes of Health* (October 1984), 88.

58. DRG, *Annual Report*, 1969, 3-8; *Annual Report*, 1971, 38-39.

59. DRG, *Annual Report*, 1974, 17; *Annual Report*, 1976, 17-18; *Annual Report*, 1978, 17-18. SATT stood for Science Base, Clinical Applications, Transfer and Research Training.

60. DRG, *Annual Report*, 1980, 17; *Annual Report*, 1981, 21; *Annual Report*, 1982, 21-22.

61. DRG, *Annual Report*, 1982, 31-43.

62. DRG, *Annual Report*, 1975, 23-31; *Annual Report*, 1976, 27-35.

63. DRG, *Annual Report*, 1977, 25-33; *Annual Report*, 1980, 28-33.

64. Memorandum, Director for Administration, NIH, "Projected FY 1983 Budget Deficit," 9/27/82, in Research 9-3/DRG, OD Central Files.

65. Minutes, ECEA meetings, 2/8/78, 6/14/78, and 11/8/78; memorandum, DRG Administrative Officer to Director, Division of Management Policy, 1/16/81, and D. Newhall, Chief of Staff to Secretary of Health and Human Services, "PHS Scientific Review and Evaluation Grants," 8/14/81 both in SREG file, DRG Special Projects Office historical file. The SREGs amounted to \$5.15 million for DRG in FY 1981.

66. Minutes, Scientific Directors Meeting, 12/2/81, 3; minutes,

Committee on Central Services financing, 12/9/91 and 12/17/81 in Budget-NIH Management Fund Study, DRG Executive Officer files.

67. Report of the DRG Subcommittee of the NIH Central Services Financing Committee, November 1982, 2-6, 9, same file. The subcommittee did recommend revising the formula.

68. Memorandum, D. Douglass to C. Becker, "Comments on Subcommittee Report," n.d., same file. As of October, 1, 1979, the ECEA was discontinued and its functions were assumed by the Extramural Program Management Committee (EPMC).

69. Minutes, EPMC Meeting, 11/10/82, in Committees 2-24; Wyngaarden statement, Advisory Committee to the Director, NIH, 11/19/83, *Speeches, Articles, and Selected Papers*, Vol. I: 43. Dr. Wyngaarden was a member of the General Medicine study section from 1960 to 1964 and the General Medicine A Study Section from 1967 to 1969.

70. Journal, Dr. Mischa E. Friedman, entry for October 1982. Dr. Friedman was Referral and Review Branch Chief from 1984 to 1988. NIH, Proceedings of the 1983 Meeting of the Chairpersons of NIH Scientific Review Groups, 2-3; DRG, *Annual Reports*, FY 1984, 13; FY 1985, 17.

71. Memorandum, Raub to RPC Members, 10/7/83, Committees 2-25. After 1980, EPMC ceased to function as a BID policy forum was limited to OERT staff advice. Report, EPMC Retreat (NIEHS), 5/9/90, 1, in Goldwater files.

72. Interview, James Wyngaarden by Stephen Strickland, 1, Acc. 464, NLM; memorandum, M. Friedman to RRB staff, "Tracking Ad Hoc Reviews by Code," 5/1/85.

73. Minutes, RPC Meeting, 7/11/84; *NIH Peer Review Notes*, January 1985, 2-4.

74. Proceedings, 1985 Meetings of the Chairpersons of DRG Initial Review Groups, 63-65. Memoranda, M. Friedman, 6/14/85; M. Friedman and D. Cain to W. Goldwater, "Formation of a Reserve Corps of Ad Hoc Consultants," 10/11/85, Committees 2-28 RPC. Memoranda, B. Beveridge to Committee Management Officer, "Options for Chartering of One-Time Meetings/Groups," 5/21/91, Goldwater Papers, RPC file.

75. Draft report, W. Raub, "NIH Extramural Programs: Strategy for FY 1983 and Beyond," 7/6/82, att. to Memorandum, Assistant Secretary for Health to W. Raub, 8/2/82, in Research & Extramural (General)/1974-1982.

76. "Report and Proposal of Working Group on the Transfer of Costs Between Related Projects," July 1982, att. to minutes, EPMC meeting, 5/18/83, Committees 2-8L/Peer Reviews System.

77. *Biennial Report of the Director, NIH*, Vol. I, 1985-1986, 22; Office of the Director, NIH, "NIH Perspective on the Florida Demonstration Project," 4/13/87, Box 4, Goldwater Papers.

78. IOM, *Responding to Health Needs and Scientific Opportunity*, 16-18.

79. Minutes, RPC meeting, 1/5/83; minutes, special EPMC meeting, 8/31/83.

80. DRG, *Annual Report* FY 1983, v; DRG Administrative Report, February 1984, 2.

81. Memorandum, Acting Chief, RRB to Deputy Director, DRG, "Resolution Regarding SBIR Review," 8/11/83, RRB historical file.
82. M. Friedman, journal, entries for October and November 1984.
83. DRG, *Keeping You Informed*, January 1984, 2.
84. Memorandum, S. Schwartz to study section offices, "Word Processors," 12/15/91, in Committees/SAB-SRB Steering Committee, RRB files.
85. Memoranda, S. Schwartz, "Minutes of DRG Technology Steering Committee," 3/5/82, 3/25/82, 7/1/82, same file.
86. Memorandum, P. Wintermeyer to C. Douglass, "Implementation of Recently Developed Awards Summary Display Facility," 9/7/84, in DRG-1/IMPAC System CRISP System, OD Central File.

Chapter 6 Endnotes

1. NIH, *Biennial Report*, 1985-1986, 22-23; J. Wyngaarden, statement to 46th meeting, Advisory Committee to the Director, NIH, 1/19/83, in OD/NIH *Speeches, Articles, and Selected Papers by James Wyngaarden, M.D.* (Bethesda, n.d.) I:43, 7-16.
2. J. Wyngaarden, "The National Institutes of Health in Its Centennial Year," *Science*, 238: 870. NIH, *Extramural Trends*, FY 1980-1989, viii, 7; NIH, *Extramural Trends*, FY 1984-1993, 5-7. The new mechanisms included First Independent Research Support and Transition (FIRST) Awards, Method to Extend Research in Time (MERIT) Awards, Small Business Innovation Research (SBIR) Awards, and Academic Research Enhancement (AREA) Awards.
3. DRG, *Peer Review Trends: Workloads and Actions of DRG Study Sections, 1980-1990*, 17, 7. Annual application flow comprises competing applications assigned to DRG sections for review and includes approximately 1,100 withdrawals and deferrals annually.
4. DRG, *Peer Review Trends: Member Characteristics 1979-1989*, 6-7; Carl D. Douglass, *The Role of Study Sections in Peer Review*, Director's Advisory Committee, 11/19/84; *NIH Data Book*, 1989, 72; *Basic Data Relating to the National Institutes of Health*, 1981, table 33.
5. Leon M. Lederman, "Science: The End of the Frontier?," presidential address, American Association for the Advancement of Science, January 1991; Grace M. Carter, *What We Know and Do Not Know About the NIH Peer Review System*, RAND Note N-1878-RC/NIH (June 1982), 1-3, 15-20; GAO Report, *University Funding: Information on the Role of Peer Review at NSF and NIH*, GAO/RCED-87-87FS (March 1987), 7-8, 34-35.
6. D. Fredrickson, "'Venice' is Not Sinking (The Water is Rising)," *Journal of the American Medical Association*, 247 (6/11/82): 3074.
7. D.K. Price, "Endless Frontier or Bureaucratic Morass?," *Daedalus* 107 (Spring 1978): 81-86; R.C. Atkinson and W.A. Blanpied, "Peer Review and the Public Interest," *Issues in Science and Technology*, 1 (Summer 1985), 101-108.
8. *Congress and the Nation VII*: 547-549, 55-56. The Omnibus Health Bill of 1986 — PL 99-660 — established physician peer review to monitor malpractice fraud. For the development of regulatory peer review since 1975,

see Sheila Jasanoff, *The Fifth Branch: Science Advisors as Policymakers* (Cambridge, MA: Harvard University Press, 1990), 21-37, 76-83.

9. Letters, Dr. Bruce M. Alberts to W.F. Raub, 4/11/85, attached to Dr. Bernadine Healy to Dr. David Botstein, 9/6/91, in Research 8-1-H Peer Review, 1991 file, OD Central File; letter, Dr. David Korn to Dr. Claude Lenfant, 8/27/87, in Committees 2-5-L-3, 1983-87 file.

10. The national science research society, Sigma X, polled 4,000 members in 1987: 86 percent supported peer review while 67.5 percent agreed with major criticisms. David L. Chandler, "Maverick Scientists Encounter Barriers," *Boston Globe*, 6/27/87, 1.

11. Report of the EPMC Subcommittee on Management of the Peer Review Process, 2/6/87, in Committees 2-25/Review Policy Committee (RPC), 1983-1987 consolidated file, OD Central File.

12. NIH, *Extramural Trends, FY 1980-1989,29*; DRG, *Peer Review Trends: Workload and Actions of DRG Study Sections, 1980-1990*, 16, 17.

13. DRG, *Peer Review Trends: Workload and Actions of DRG Study Sections, 1980-1990*, 37-41, 18-19. Beginning in 1992, the term "Disapproved" was replaced as a disposition action by the phrase "Not Recommended for Further Consideration." Intended to facilitate identification of non-meritorious applications, the new terminology accounted for about 12.5 percent of applications in January 1992, compared with about 4 percent under the old terminology in January 1991. DRG Advisory Committee Minutes, 4/6-7/92, 17-18.

14. Minutes, Review Policy Committee, 12/3/86, and memorandum, W. Goldwater to Dr. George J. Galasso, Acting ADERT, "Continuing Downward Movement of Median Priority Scores," 1/7/87, in Committees 2-25.

15. Notes, Dr. Barbara Packard, Associate Director, NILBI, "Summary of NIH Public Briefings - Peer Review Issues," in Committees 2-5-L-3, 1983-1987 consolidated files, OD Central File.

16. Speech notes, J. Wyngaarden, "The Policies and Programs of NIH: Myths, Realities, and Future Directions" 11/5/87, in *Speeches, Articles, and Selected Papers by James B. Wyngaarden IV*: 320, 25-27.

17. J. Green, interview with Richard Mandel, 1/31/95, 37.

18. DRG, *Keeping You Informed*, January 1986, 11; April/May 1986 6-7; June 1986, 5-6; July-August 1986, 5-6; October 1986, 7-8; November/December 1986, 10-11; January/February 1987, 8-9; March/April 1987, 7; May/June 1987, 10; September 1987, 10. A total of 62 retirements are listed for 1986-1991.

19. *NIH Record*, 38 (11/4/86), 5. James M. Pike, NHLBI Grants Management Officer, was appointed DRG Executive Officer, and Dr. Samuel H. Joseloff, Executive Secretary of the NHLBI Advisory Council, was appointed Chief of the DRG Office of Grants Inquiries. Patricia B. Bailey, NHLBI Administrative Assistant, was appointed Chief of the DRG Administrative Branch.

20. DRG, *Annual Report*, FY 1986, 1. The meeting took place on 4/14/86 at the Fourth Presbyterian Church, Bethesda.

21. DRG, *Annual Report*, FY 1987, 30-31; *NIH Peer Review Notes*.

January 1987, 7. A sixth review section, Immunology, Virology, and Pathology, was added in January 1988.

22. DRG, *Keeping You Informed*, January/February 1988, 3.

23. DRG, *Keeping You Informed*, April/May 1988, 1-2.

24. J. Green, interview with Richard Mandel, 1/13/95, 41. Memorandum, Director, DRG to Director NIH, "Allocation of SES Slot for the Position of Associate Director for Statistics and Analysis," 4/9/86, DRG, Directors Files, ISB folder.

25. DRG, *Annual Report* FY 1987, vii; *NIH Record*, 39 (12/15/87), 4.

26. DRG, *Keeping You Informed*, 1987, 1988, 1989; *NIH Data Book*, 1991, 76.

27. J. Pike, notes for staff meeting, 3/10/87, Director's Files, DRG staff meetings folder.

28. DRG, *Keeping You Informed*, Summer 1989, 4.

29. *NIH Peer Review Notes*, February 1990, 4-5; DRG, *Advisory Committee Minutes*, 12/1/89, 16-17. Dr. Meier was succeeded by Professor Mary Jane Osborn of the University of Connecticut in 1992. The current chairperson is Dr. Thomas Braciale of the University of Virginia. For a description of current Council functions and procedures, see Samuel M. Schwartz and Mischa E. Friedman, *A Guide to NIH Grant Programs* (New York: Oxford University Press, 1992), 130-38.

30. Memorandum, W. Raub to BID Directors, "Reduction of Administrative Burdens on NIH Grantees," 4/19/84, in Committees 2-20/Advisory Committee to the Director, NIH, 1983-1987 consolidated file; Claude E. Barfield, *Science Policy From Ford to Reagan: Change and Continuity* (Washington Enterprise Institute, 1982), 56-57.

31. *NIH Peer Review Notes*, September 1986, 4-5.

32. Memorandum, Review Policy Committee (RPC) to G. Galasso, ADERT, "Continuing Downward Movement of Median Priority Scores," 1/7/87, in Committees 2-25/RPC.

33. Minutes, EPMC 9/9/87, 1-3, Office of Extramural Programs; Report, Working Group on Movement of Priority Scores, 8/10/87, in Committees 2-5-L-3, OD Central Files; DRG, *Advisory Committee Minutes*, 12/1/89, 18-20; minutes, EPMC 10/12/88, 3, and 2/22/89, 1-21.

34. Draft Report, Working Group on Movement of Priority Scores, 8/10/87, 3, in Committees 2-5-L-3, 1983-87 consolidated files.

35. Memorandum, Director, NIGMS to Executive Committee of ICD Directors, "NIGMS Strategies for Funding Basic Research," 10/2/92, in Committees 2-3-A/Executive Committee of the ICD Directors, 1992 file.

36. C. Lenfant, Note to Peer Review Committee members, 5/10/88, in Research 8-1-h/Peer Review, 1988 file, OD Central File.

37. NIH, *Report of the NIH Peer Review Committee* (December 1988), 17, 25, 44.

38. Final Report, The Receipt and Referral Subcommittee of the Receipt, Referral and Review Study, 3/1/88, 2-4, 9-11, in Research 9-3/DRG, 1988 file, OD Central File.

39. Final Report, The Review Subcommittee of the Receipt, Referral and Review Committee, 3/8/88, 3-6; Final Report, "A Productivity Study of the

DRG Grant Application Receipt and Referral Process," ROW Sciences, Inc., 2/4/88, same file.

40. DRG, *NIH Peer Review Notes* (September 1987), 1-3; minutes, EPMC meeting, 6/17/87, 2-3, Committees 2-24, 1983-1987 consolidated file.

41. *Sustaining the Quality of Peer Review: A Report of the Ad Hoc Panel* (December 1989), 111-1v; minutes, DRG Advisory Committee, 4/2/90, 21-30.

42. DRG Report, "Recommendations of the Ad Hoc Panel on 'Sustaining the Quality of Peer Review': Comments from DRG Executive Secretaries and Review Section Chiefs" (June 1990), 1-3, 5, in DRG Director's Files, Peer Review folder. The authors observed that "continued reduction in the support of highly meritorious proposals poses more of a threat towards damaging the quality of peer review than any other issue identified in this document."

43. DRG Report, *Distributing DRG's Review Responsibilities: A Discussion of Alternative Approaches* (October 1991), 4-10, 19-21, 28-29, in Research 9-3/DRG, 1991 file, OD Central File.

44. Draft discussion outline, "Strategic Policy Issue: Peer Review," notes of 7/19/91 discussion, both in DRG Director's file (inactive)/Policy Panel: Peer Review. Discussants noted, "Many accomplished scientists contend they use current grant support to conduct limited innovative studies — without having described the undertaking in their competitive applications. When sufficient data have been accrued (and they have a head start), they then describe the effort in an application and request more adequate financial support." 7/19/91 notes, 4.

45. NIH, *Panel Report on Peer Review* (8/29/91), 7-8, 17-19, 22-25, in Grants Information Office history file.

46. Minutes, RPC meeting, 2-4; DRG, *Advisory Committee Minutes*, 4/6-7/92, 22-27; memorandum, Director, DRG to Panel on Peer Review members, "Phase II Peer Review Report;" B. Healy, note to C. Lenfant, 10/4/91, in DRG Director's Files (inactive)/Policy Panel: peer review.

47. NIH, *Panel Report on Peer Review* (8/29/91), 16, 8-9.

48. DRG, Final Report, Application Transfer Team (ATT) Planning Study of Grants-in-Aid Application and Award Processing Requirements (1/27/86), 35, in DRG Directors Files/Automation Strategy.

49. Memorandum, N. Suszynski, "Results for DRG's Automated Plan Survey," 2/22/88, same file.

50. Memoranda, Dr. Allen Stoolmiller to N. Suszynski, 1/6/88, and Director, DRG to Director, Division of Grants and Contracts, NIH, "New Technology, Electronic Transfer, and Storage of Information," 7/28/89, DRG Directors Files/ISB folders.

51. *NIH Record*, 43 (7/23/91) 1,8; memorandum, R. Feldman to Dr. Arnold W. Pratt, "Results of a Project With Dr. John Mathis in the DRG," 12/3/87, in DRG Directors' File, EGAD folder.

52. Minutes, Technical Advisory Group, 1/31/90, and memorandum, J. Mathis to J. Green, "'Set Aside' Funds for EGAD Project Evaluation," 3/1/90, in DRG Directors File, EGAD folder.

53. N. Suszynski, briefing materials "DRG Automation Project," April 1988, same file, ISB folder.

54. Memoranda, N. Suszynski to Dr. David Rodbard, Director, DCRT, "IMPAC/CRISP DBMS Migration Project," 2/11/91; Patrick Cavanaugh and Howard E. Clark, "Comparison of Database Management Systems for the IMPAC/CRISP Redesign" (March 1990), both in DRG Director's Files, Database Migration Project folder.

55. DRG, *NIH Peer Review Notes* (June, 1990) 1-2; *DRG Advisory Committee Minutes* (April 1991), 10-17; memoranda, Director, DCRT to Director, DRG, "DCRT Role in IMPAC Migration," 8/27/91, 2, in DRG Director's Files, Database Migration Project folder.

56. ISB report, "EGAD system: Anticipated Implementation Step, FY 92," 1/28/92, Director's file, EGAD folder; EGAD briefing, 7/23/92, 6-7; notes, DCRT/DRG meeting, 2/8/94, same file.

57. DRG, *Advisory Committee Minutes*, 4/4-5/94, 10-11.

58. Memorandum, R. Feldman to A. Pratt, "Results of A Project with John Mathis in DRG," 12/3/87, Director's File, ISB folder; William Booth, "NIH May Have to Move ASAP on AIDS Grants," *Science*, 239:20 (1/8/88). The interval later changed to 6 months after receipt, on recommendation of the DRG Director.

59. Memoranda, Dr. Katherine L. Bick, Deputy Director for Extramural Research, NIH, to BID Directors, "Response to Congressional Intent for Speed Award of AIDS Grants...", 1/26/88; Dr. John James, Associate Director for Special Projects, DRG to Dr. George Galasso, Associate Director for Extramural Affairs, NIH "AIDS Information System," 3/7/88; J. Green to Director, Division of Grants and Contracts, PHS, "Information on AIDS Grants and Contracts," 4/28/88, all in DRG Director's file, AIDS folder.

60. Memorandum, K. Bick to Office of Information and Regulatory Affairs, OMB, "Addendum to Revision of 0925-0001...", 2/18/88, same file.

61. Institute of Medicine, *The AIDS Research Program of the National Institute of Health* (Washington, DC: National Academy Press, 1991), 119; DRG Director, presentation notes, FY94 Preliminary DRG Budget Review Session, 5/6/92, Director's files.

62. IOM, *AIDS Research Program*, 107; memorandum, J. Mahoney to J. Green, "Resources Needed for Expedited Review of AIDS Applications," 3/14/88, in Research 9-3 DRG, 1988 consolidated file, OD Central Files; Marjorie Sun, "NIH Budget Boost Mostly for AIDS," *Science*, 241: 1427 (9/16/88).

63. Minutes, EPMC meeting, 1/14/87, 4-5, in Committees 2-24, 1983-1987 consolidated file, OD Central File.

64. IOM, *Confronting AIDS: Directions for Public Health, Health Care, and Research* (Washington, DC: National Academy Press, 1986), 241-44; same volume, 1988 update, 151.

65. IOM, *AIDS Research Program*, 102-105.

66. DRG, *Advisory Committee Minutes*, 12/1/89, 1-5; *NIH Record*, 4/2/91, 6-7. The Assistant Secretary for Health proposed in 1990 to double the

number of research project grant awards by 1997. For other factors conducive to an expansive NIH policy at this juncture, see memorandum, J. Moskowitz to ICD Directors, "Background package for NIH Strategic Planning Initiative," 10/5/90, in DRG Directors' Files (inactive)/NIH Strategic Plan.

67. Interview, J. Green, 82-84; *NIH Record*, 3/31/92, 1,6. According to the proposal filed by Dr. Wyngaarden's staff on April 20, 1988, the building was intended to "house the entire Division of Research Grants." Wyngaarden to Dr. Robert Windom, Assistant Secretary for Health, 4/21/88, in Buildings and Grounds 9-01/Consolidated Office Building, 1988 consolidated file, OD Central Files.

68. U.S. Congress, House, *Hearing before a Subcommittee of the Committee on Appropriations*, 103rd Congress, 1st Session (Washington, DC: GPO, 1994), 407-11, 433-39, 478; *NIH Almanac*, 1993, 111, 115.

69. *NIH Almanac*, 1993-1994, 13. The three new NIH components—the National Institute of Mental Health (NIMH), the National Institute of Drug Abuse (NIDA), and the National Institute of Alcohol Abuse and Alcoholism (NIAAA), brought their own extramural system and body of review procedures.

70. NIH, *Panel Report on Peer Review*, 8/29/91; memorandum, Betty Beveridge, Committee Management Officer to RPC. "Options for Chartering of One Time Meetings," 5/21/91; report, RPC Subcommittee on Workload Management, 6/10/92, both in RPC minutes file, Goldwater Papers.

71. Memorandum, J. Diggs, Deputy Director for Extramural Research to ICD Directors, EPMC, RPC, "Replacement Term for 'Executive Secretary,'" 3/19/91, in RPC minutes, Goldwater Files.

72. NIH, *Investment for Humanity: A Strategic Vision for the National Institutes of Health* (1993), 97-98; memorandum, J. Moskowitz, Associate Director for Science Policy and delegation to ICD Directors, "Background Package for NIH Science Policy Strategic Planning Initiative," 10/10/90, in DRG Directors Files/(Inactive) NIH Strategic Plan.

73. Summary Report, *NIH Director's Chairpersons Meeting*, 1/17/92, DRG Office of Grants Inquiries, 34-35; minutes, EPMC meetings, 6/2/93, 3, and 6/23/93; J. Green interview, 87-89.

74. *Minutes*, EPMC meetings, 3/10/93, 4; 5/19/93, 3-4; 6/16/94, 2-4; *NIH Guide*, 23 (7/1/94) 25: 2-5. Dr. Atwell is Director, Division of Extramural Activities, National Institute of Neurological Disorders and Stroke.

75. *NIH Record*, 11/23/93; *NIH Peer Review Notes*, October 1993. The new NIH Director's views were elucidated in J. Bishop, M. Kirschner, and H. Varmus, "Science and the New Administration," *Science*, 259 (1/22/93): 444-45, and in his 11/3/93 statement to the Senate Committee on Labor and Human Resources, reprinted in *The NIH Catalyst* (November 1993); "NIH Director Harold Varmus: On the Record," *Journal of NIH Research*, 8 (January 1988): 30-32; Varmus: The View From Bethesda," *Science*, 262 (11/26/93): 1364-66.

76. *NIH Peer Review Notes*, June 1994; DRG, *Advisory Committee Minutes*,

11/21-22/94, 11-14, 20-27; notes, Triage Evolution Group meeting, 3/15/94, in DRG Directors Files/(Inactive) Triage System; memorandum, Director, DRG to Acting Director, Office of Financial Management, "DRG Streamlining Plans," 8/10/94, in DRG Director's Files/Streamlining.

77. DRG, *Advisory Committee Minutes*, 4/4-5/94, 18-19; "NIH Tunes Up Peer Review," *Science*, 263 (3/4/94): 1212-1213; memorandum, Associate Director for Referral and Review to RRB staff, "GTA Supervision," 2/1/94, in DRG Director's Files/(Active) RRB Branch.

78. DRG, *Advisory Committee Minutes*, 4/4-5/94, 18-19; "NIH Tunes Up Peer Review," *Science*, 263 (3/4/94): 1212-13.

79. Memorandum, Director, DRG to Acting Director, Office of Financial Management, "DRG Streamlining Plans," 8/10/94.

80. *NIH Peer Review Notes* (June 1994), 3-4.

Epilogue Endnotes

1. *Journal of NIH Research*, 7 (January 1995), 27-29, and (May 1995), 25-26.

2. *Report of the Working Group on the Division of Research Grants* (May 1995), 5-11.

3. U.S. General Accounting Office, *Peer Review: Reforms Needed to Ensure Fairness in Federal Agency Grant Selection* (June 1994), 69-70.

4. Statistics, Evaluation, and Analysis Section, Information Systems Branch.

5. George T. Mazuzan, "Peer Review: the Heart of the Research Enterprise," *SUNY Research* (1988): 1-2.

Appendix A
DRG Employees, Active Consultants, and Chartered Review Groups, 1946 – 1994

| Fiscal Year | <u>Actual</u> | | <u>DRG</u> | <u>Total</u> | <u>Active</u> |
|-------------|---------------------|---------------------|-----------------------|-------------------------|-----------------------|
| | <u>Total NIH</u> | <u>Fulltime DRG</u> | <u>Chartered</u> | <u>Including</u> | <u>DRG</u> |
| | <u>Employees 1/</u> | <u>Employees 2/</u> | <u>Study Sections</u> | <u>Subcommittees 3/</u> | <u>Consultants 4/</u> |
| 1946 | 1436 | 12 | 10 | | 132 |
| 1947 | 1505 | 54* | 20 | | 198 |
| 1948 | 2245 | 90 | 23 | | 236 |
| 1949 | 2937 | 122 | 25 | | 229 |
| 1950 | 2888 | 106 | 17 | | 204 |
| 1951 | 3012 | 110 | 20 | | 200 |
| 1952 | 3277 | 101 | 18 | | 210 |
| 1953 | 3888 | 97 | 19 | | 226 |
| 1954 | 4621 | 102 | 17 | | 208 |
| 1955 | 5412 | 113 | 23 | | 288 |
| 1956 | 6334 | 128 | 23 | | 312 |
| 1957 | 7215 | 208 | 28 | | 405 |
| 1958 | 7145 | 232 | 30 | | 461 |
| 1959 | 8484 | 278 | 36 | | 582 |
| 1960 | 9109 | 345 | 40 | | 639 |
| 1961 | 10175 | 432 | 41 | | 628 |
| 1962 | 11037 | 443 | 42 | | 672 |
| 1963 | 11511 | 544 | 43 | | 717 |
| 1964 | 11822 | 581 | 44 | | 750 |
| 1965 | 12194 | 592 | 50 | | 807 |
| 1966 | 12643 | 595 | 51 | | 897 |
| 1967 | 11730 | 571 | 45 | | 670 |
| 1968 | 13105 | 569 | 44 | | 597 |
| 1969 | 13350 | 535 | 48 | | 690* |
| 1970 | 13243 | 425 | 47 | | 690* |
| 1971 | 14002 | 417 | 47 | | 690* |
| 1972 | 13789 | 408 | 48 | | 692 |
| 1973 | 12931 | 398 | 47 | | 673 |
| 1974 | 13318 | 393 | 47 | | 682 |
| 1975 | 13897 | 377 | 52 | | 732 |
| 1976 | 14495 | 396 | 50 | | 742 |
| 1977 | 14658 | 392 | 50 | | 769 |
| 1978 | 14610 | 409 | 50 | | 838 |
| 1979 | 14439 | 399 | 54 | | 838 |
| 1980 | 14634 | 386 | 54 | 55 | 880 |
| 1981 | 14984 | 423 | 54 | 57 | 883 |
| 1982 | 14869 | 406 | 63 | 81 | 1097 |
| 1983 | 15449 | 414 | 64 | 85 | 1201 |
| 1984 | 15212 | 432 | 65 | 88 | 1255 |
| 1985 | 14799 | 421 | 66 | 90 | 1343 |
| 1986 | 14479 | 413 | 67 | 92 | 1407 |
| 1987 | 15243 | 398 | 68 | 92 | 1476 |
| 1988 | 15486 | 442 | 68 | 92 | 1458 |
| 1989 | 15206 | 431 | 72 | 98 | 1592 |
| 1990 | 16181 | 442 | 81 | 99 | 1716 |
| 1991 | 16947 | 449 | 83 | 101 | 1768 |
| 1992 | 17405 | 452 | 83 | 102 | 1770 |
| 1993 | 18071 | 440 | 84 | 102 | 1763 |
| 1994 | 16486 | 420 | 19** | 100 | 1770 |

* Estimated.

** Excludes 6 Special Emphasis Panels and DRG Advisory Committee. Source: DRG/CMO.

1/ Includes part-time and intermittent employees. Source: *NIH Almanac*.

2/ Actual full-time employees.

3/ Source: DRG/CMO.

4/ Source: DRG Director's Review.

Appendix B
DRG Obligations, 1970 - 1994 (dollars in thousands)

| <u>Fiscal Year</u> | <u>Total NIH Appropriation 1/</u> | <u>DRG Obligations From Management Fund 2/</u> |
|--------------------|---------------------------------------|----------------------------------------------------|
| 1970 | 1,443,977 | 7,696 |
| 1971 | 1,596,314 | 8,358 |
| 1972 | 2,081,580 | 9,030 |
| 1973 | 1,523,101 | 9,445 |
| 1974 | 1,994,432 | 10,737 |
| 1975 | 2,108,886 | 10,213 |
| 1976 | 2,238,410 | 10,197 |
| 1977 | 2,581,988 | 10,902 |
| 1978 | 2,828,014 | 11,635 |
| 1979 | 3,184,641 | 12,268 |
| 1980 | 3,428,842 | 13,614 |
| 1981 | 3,572,506 | 15,014 |
| 1982 | 3,643,461 | 16,475 |
| 1983 | 4,013,135 | 17,253 |
| 1984 | 4,493,553 | 18,381 |
| 1985 | 5,121,557 | 18,910 |
| 1986 | 5,296,977 | 19,752 |
| 1987 | 6,175,038 | 22,662 |
| 1988 | 6,610,430 | 26,554 |
| 1989 | 7,157,978 | 29,320 |
| 1990 | 7,581,484 | 31,886 |
| 1991 | 8,154,101 | 34,345 |
| 1992 | 10,010,365 | 34,472 |
| 1993 | 10,328,117 | 35,736 |
| 1994 | | 39,838 |

1/ Comprised of aggregate extramural programs and direct Institute operations.

2/ Excludes Scientific Review and Evaluation Award funds.

Source: DRG Budget Office.

Appendix C
NIH Awards and Applications, and DRG Reviews, 1970 – 1994 (dollars in thousands)

| <u>Fiscal Year</u> | <u>Total NIH Research Grant Awards 1/</u> | <u>NIH Research Project Grant Awards 2/</u> | <u>Total NIH Competing Applications 3/</u> | <u>Total Reviewed DRG</u> | <u>Competing NIH RPG Applications</u> | <u>Requested Dollars 4/</u> | <u>Success Rate</u> | <u>RPGs Reviewed in DRG</u> | <u>Requested Dollars</u> |
|--------------------|---------------------------------------------------|-----------------------------------------------------|----------------------------------------------------|-----------------------------------|-----------------------------------------------|---------------------------------|-------------------------|-------------------------------------|------------------------------|
| 1970 | 17,212 | 11,751 | 16,416 | 11,083 | 9,174 | 456,774 | 35.5 | 7,480 | 349,276 |
| 1971 | 16,380 | 11,501 | 16,299 | 10,032 | 9,130 | 501,051 | 36.2 | 7,438 | 370,701 |
| 1972 | 17,260 | 11,929 | 16,983 | 8,960 | 10,521 | 644,654 | 40.8 | 8,378 | 454,457 |
| 1973 | 15,856 | 11,544 | 15,720 | 9,499 | 11,375 | 786,487 | 27.6 | 9,040 | 542,752 |
| 1974 | 18,770 | 13,258 | 16,811 | 10,780 | 11,579 | 864,473 | 44.5 | 9,116 | 604,777 |
| 1975 | 17,113 | 13,430 | 20,769 | 14,364 | 11,978 | 937,086 | 43.5 | 9,755 | 686,449 |
| 1976 | 21,294 | 17,604 | 20,024 | 13,432 | 12,424 | 1,042,904 | 33.4 | 9,681 | 735,359 |
| 1977 | 17,469 | 14,199 | 21,921 | 15,690 | 15,710 | 1,443,120 | 28.4 | 12,913 | 1,062,848 |
| 1978 | 18,632 | 15,109 | 22,994 | 16,966 | 16,725 | 1,571,751 | 34.3 | 14,409 | 1,209,611 |
| 1979 | 21,363 | 17,539 | 23,214 | 16,710 | 16,745 | 1,721,832 | 39.5 | 13,977 | 1,277,897 |
| 1980 | 22,213 | 18,430 | 23,264 | 16,499 | 16,638 | 1,787,774 | 32.7 | 13,686 | 1,337,109 |
| 1981 | 22,408 | 18,514 | 24,308 | 18,168 | 18,061 | 2,131,249 | 30.7 | 15,302 | 1,666,831 |
| 1982 | 21,539 | 17,780 | 24,449 | 19,276 | 19,118 | 2,433,944 | 29.2 | 16,436 | 1,923,916 |
| 1983 | 22,549 | 18,587 | 23,214 | 18,588 | 18,653 | 2,283,170 | 31.3 | 15,390 | 1,913,001 |
| 1984 | 23,480 | 19,215 | 24,997 | 19,013 | 18,506 | 2,593,761 | 32.1 | 15,413 | 2,033,967 |
| 1985 | 24,993 | 19,465 | 27,897 | 21,070 | 20,279 | 3,153,952 | 33.1 | 16,694 | 2,344,251 |
| 1986 | 25,493 | 20,662 | 28,334 | 21,053 | 19,741 | 3,266,543 | 32.6 | 16,021 | 2,405,623 |
| 1987 | 27,689 | 22,004 | 27,639 | 19,696 | 19,275 | 3,491,474 | 35.7 | 15,176 | 2,404,797 |
| 1988 | 28,408 | 22,646 | 30,391 | 20,097 | 20,603 | 4,082,003 | 32 | 15,375 | 2,634,381 |
| 1989 | 29,250 | 23,151 | 31,208 | 21,389 | 20,505 | 4,248,628 | 28.5 | 15,897 | 2,935,225 |
| 1990 | 29,502 | 23,180 | 32,387 | 21,965 | 21,459 | 4,882,658 | 24.5 | 16,599 | 3,309,913 |
| 1991 | 30,897 | 24,024 | 32,118 | 20,620 | 21,252 | 5,054,508 | 28.6 | 15,482 | 3,271,588 |
| 1992 | 31,363 | 25,151 | 32,419 | 21,587 | 21,678 | 5,415,117 | 29.4 | 15,784 | 3,397,528 |
| 1993 | 31,126 | 25,063 | 34,416 | 22,564 | 23,575 | 5,700,069 | 23.5 | 16,632 | 3,598,876 |
| 1994 | 32,100 | 25,764 | 37,934 | 24,432 | 25,364 | 5,962,613 | 25.4 | 17,164 | 3,794,713 |

Appendix C - Notes

- 1/ Includes NIAAA, NIDA, and NIMH for all years.
- 2/ Includes the realignment of 1994, adding R03 and R21 (except NCRR)
Represents grants coded R01, R22, R23, R35, R37, R43, R44, but not P01, P41,
or P42. Source: IMPAC--SAES/DRG--IRS Program RFMDADY 4.
- 3/ Fiscal Year calculation is based on fiscal year of appropriation or start date.
Original applications and their amendments for the same fiscal year are
counted as one.
- 4/ Dollar amounts are first year dollars requested, with adjustments for
indirect costs; excludes SBIR/STTR programs. Source: FY 70-94
Success Rate File.

Appendix D

DRG Study Sections, 1946 – 1995

Chartered study sections and subcommittees including name changes are as listed in *Members of Advisory Groups of the National Institutes of Health, 1946 – 1961*, Office of the Chief, Division of Research Grants, 1961; *Members of Advisory Groups of the National Institutes of Health, 1961 – January 1, 1967*, Committee Management Office, Division of Research Grants, 1968; by the NIH Committee Management Office semi-annually in *NIH Advisory Committees* from 1967 to 1993 and *Electronic Roster* for 1994 through June 1995. Fellowship review committees are as listed in these sources from 1961 to 1980. Additional information on the establishment of subcommittees is from the Charter File, Office of the Director, DRG, Committee Management Office. Unchartered study sections for 1958 – 1989 are as listed in *NIH Scientific Directory and Annual Bibliography*. Institute review groups are excluded.

Appendix D

| Study Section Name | DtEst | DtTrm | Comments |
|-----------------------------------------------------------------|-------|-------|-----------------------|
| Accident Prevention Research Study Section | 1961 | 1963 | |
| Advisory Committee on Computers in Research | 1960 | 1964 | |
| AIDS and Related Research Study Section 1 | 1990 | | |
| AIDS and Related Research Study Section 2 | 1990 | | |
| AIDS and Related Research Study Section 3 | 1990 | | |
| AIDS and Related Research Study Section 4 | 1990 | | |
| AIDS and Related Research Study Section 5 | 1990 | | |
| AIDS and Related Research Study Section 6 | 1990 | | |
| AIDS and Related Research Study Section 7 | 1990 | | |
| Allergy and Immunology A Study Section | 1963 | 1967 | |
| Allergy and Immunology B Study Section | 1963 | 1967 | |
| Allergy and Immunology Study Section | 1956 | 1963 | |
| Allergy and Immunology Study Section | 1967 | | |
| Allergy and Infectious Diseases Program-Project Committee | 1961 | 1963* | *Transferred to NIAID |
| Anatomy and Pathology Fellowships Review Committee | 1965 | 1970 | |
| Anatomy and Pathology Fellowships Review Panel | 1962 | 1965 | |
| Anatomy and Physiology Fellowships Review Panel | 1960 | 1962 | |
| Antibiotics Study Section | 1946 | 1949 | |
| Applied Physiology and Bioengineering Study Section | 1972 | 1976 | |
| Applied Physiology and Orthopedics Study Section | 1976 | 1981 | |
| Applied Physiology Study Section | 1964 | 1972 | |
| Arthritis and Metabolic Diseases Program-Project Committee | 1961 | 1973 | |
| Arthritis and Rheumatism Study Section | 1949 | 1950 | |
| Bacteriology and Mycology A Study Section | 1964 | 1967 | |
| Bacteriology and Mycology A Study Section* | 1981 | 1986 | *Subcommittee |
| Bacteriology and Mycology B Study Section | 1964 | 1967 | |
| Bacteriology and Mycology B Study Section* | 1981 | 1986 | *Subcommittee |
| Bacteriology and Mycology I Study Section* | 1986 | | *Subcommittee |
| Bacteriology and Mycology II Study Section* | 1986 | | *Subcommittee |
| Bacteriology and Mycology Study Section | 1958 | 1964 | |
| Bacteriology and Mycology Study Section | 1967 | 1981 | |
| Bacteriology Study Section | 1946 | 1949 | |
| Behavioral and Neurosciences 1 Study Section* | 1983 | | *Subcommittee |
| Behavioral and Neurosciences 2 Study Section* | 1983 | | *Subcommittee |
| Behavioral and Neurosciences 3 Study Section* | 1983 | 1987 | *Subcommittee |
| Behavioral and Neurosciences 4 Study Section* | 1983 | 1985 | *Subcommittee |
| Behavioral and Neurosciences 5 Study Section* | 1983 | 1984 | *Subcommittee |
| Behavioral and Neurosciences A Study Section* | 1981 | 1983 | *Subcommittee |
| Behavioral and Neurosciences B Study Section* | 1981 | 1983 | *Subcommittee |
| Behavioral and Neurosciences C Study Section* | 1981 | 1983 | *Subcommittee |
| Behavioral and Neurosciences D Study Section* | 1981 | 1983 | *Subcommittee |
| Behavioral and Neurosciences E Study Section* | 1981 | 1983 | *Subcommittee |
| Behavioral Medicine Study Section | 1980 | | |
| Behavioral Sciences A Fellowships Review Committee | 1965 | 1967* | *Transferred to NIMH |
| Behavioral Sciences B Fellowships Review Committee | 1967 | 1967* | *Transferred to NIMH |
| Behavioral Sciences Fellowships Review Panel | 1960 | 1965 | |
| Behavioral Sciences Study Section | 1959 | 1967* | *Transferred to NIMH |
| Bio-Organic and Natural Products Chemistry Study Section | 1980 | | |
| Bio-Psychology Study Section | 1978 | | |
| Bioanalytical and Metallobiochemistry Study Section | 1977 | 1980 | |
| Biochemical Endocrinology Study Section | 1979 | | |
| Biochemistry A Study Section* | 1981 | 1986 | *Subcommittee |
| Biochemistry and Molecular Biology Fellowships Review Committee | 1968 | 1970 | |
| Biochemistry and Nutrition A Fellowships Review Committee | 1965 | 1968 | |
| Biochemistry and Nutrition B Fellowships Review Committee | 1965 | 1968 | |
| Biochemistry and Nutrition Fellowships Review Committee | 1965 | 1965 | |
| Biochemistry and Nutrition Fellowships Review Panel | 1960 | 1965 | |
| Biochemistry and Nutrition Study Section | 1946 | 1951 | |
| Biochemistry B Study Section* | 1981 | 1986 | *Subcommittee |
| Biochemistry I Study Section* | 1986 | 1990 | *Subcommittee |

Appendix D (continued)

| Study Section Name | DtEst | DtTrm | Comments |
|-------------------------------------------------------------------|-------|-------|---------------|
| Biochemistry II Study Section* | 1986 | 1990 | *Subcommittee |
| Biochemistry Study Section | 1951 | 1983 | |
| Biochemistry Study Section | 1991 | | |
| Biological Sciences 1 Study Section* | 1989 | | *Subcommittee |
| Biological Sciences 2 Study Section* | 1989 | | *Subcommittee |
| Biological Sciences 3 Study Section* | 1989 | | *Subcommittee |
| Biomedical Communications Study Section | 1966 | 1976 | |
| Biomedical Engineering Fellowships Review Committee | 1966 | 1970 | |
| Biomedical Sciences 1 Study Section* | 1983 | 1989 | *Subcommittee |
| Biomedical Sciences 2 Study Section* | 1983 | 1989 | *Subcommittee |
| Biomedical Sciences 3 Study Section* | 1983 | 1989 | *Subcommittee |
| Biomedical Sciences 4 Study Section* | 1983 | 1989 | *Subcommittee |
| Biomedical Sciences 5 Study Section* | 1983 | 1989 | *Subcommittee |
| Biomedical Sciences 6 Study Section* | 1984 | 1989 | *Subcommittee |
| Biomedical Sciences 7 Study Section* | 1986 | 1989 | *Subcommittee |
| Biomedical Sciences A Study Section* | 1979 | 1983 | *Subcommittee |
| Biomedical Sciences B Study Section* | 1979 | 1983 | *Subcommittee |
| Biomedical Sciences C Study Section* | 1981 | 1983 | *Subcommittee |
| Biomedical Sciences D Study Section* | 1981 | 1983 | *Subcommittee |
| Biomedical Sciences Study Section | 1989 | | |
| Biophysical and Organic Chemistry Fellowships Review Panel | 1960 | 1962 | |
| Biophysical Chemistry Study Section | 1981 | | |
| Biophysics and Biophysical Chemistry A Study Section | 1965 | 1981 | |
| Biophysics and Biophysical Chemistry B Study Section | 1965 | 1981 | |
| Biophysics and Biophysical Chemistry Fellowships Review Committee | 1965 | 1970 | |
| Biophysics and Biophysical Chemistry Fellowships Review Panel | 1962 | 1965 | |
| Biophysics and Biophysical Chemistry Study Section | 1955 | 1965 | |
| Biostatistics Fellowships Review Committee | 1966 | 1966 | |
| Blood Research Study Section | 1980 | 1983 | |
| Cancer Chemotherapy Study Section | 1956 | 1963 | |
| Cancer Program-Project Committee | 1961 | 1962 | |
| Cardiovascular A Study Section | 1964 | 1971 | |
| Cardiovascular and Pulmonary Research A Study Section | 1971 | 1973 | |
| Cardiovascular and Pulmonary Research B Study Section | 1971 | 1973 | |
| Cardiovascular and Pulmonary Study Section | 1973 | 1990 | |
| Cardiovascular and Renal Study Section | 1973 | | |
| Cardiovascular B Study Section | 1964 | 1971 | |
| Cardiovascular Study Section | 1990 | | |
| Cardiovascular Study Section | 1946 | 1964 | |
| Cell Biology A Study Section | 1965 | 1967 | |
| Cell Biology B Study Section | 1965 | 1967 | |
| Cell Biology Fellowship Review Committee | 1965 | 1966 | |
| Cell Biology Fellowships Review Panel | 1960 | 1965 | |
| Cell Biology Study Section | 1958 | 1965 | |
| Cell Biology Study Section | 1967 | 1983 | |
| Cellular Biology and Physiology I Study Section* | 1983 | | *Subcommittee |
| Cellular Biology and Physiology II Study Section* | 1983 | | *Subcommittee |
| Cellular Physiology Study Section | 1979 | 1982 | |
| Chemical Pathology Study Section | 1979 | | |
| Chemotherapy Study Section | 1963 | 1965 | |
| Child Health and Human Development Program-Project Committee | 1964 | 1970 | |
| Clinical Research Fellowships Review Committee | 1965 | 1970 | |
| Clinical Research Fellowships Review Panel | 1960 | 1965 | |
| Clinical Sciences 1 Study Section* | 1983 | | *Subcommittee |
| Clinical Sciences 2 Study Section* | 1983 | | *Subcommittee |
| Clinical Sciences 3 Study Section* | 1983 | 1990 | *Subcommittee |
| Clinical Sciences 4 Study Section* | 1983 | 1990 | *Subcommittee |
| Clinical Sciences A Study Section* | 1979 | 1983 | *Subcommittee |
| Clinical Sciences B Study Section* | 1979 | 1983 | *Subcommittee |
| Clinical Sciences C Study Section* | 1979 | 1983 | *Subcommittee |

Appendix D (continued)

| Study Section Name | DtEst | DtTrm | Comments |
|-----------------------------------------------------------|-------|-------|----------------------|
| Clinical Sciences D Study Section* | 1981 | 1983 | *Subcommittee |
| Committee on Radiation Studies | 1951 | 1955 | |
| Committee on Sectional Research in Microbiology | 1951 | 1955 | |
| Committee on Standards for Grants Surveys | 1952 | 1955 | |
| Communicative Sciences Study Section | 1962 | 1982 | |
| Computer and Biomathematical Sciences Study Section | 1970 | 1977 | |
| Computer Research Study Section | 1964 | 1970 | |
| Dental Study Section | 1946 | 1974 | |
| Developmental Behavioral Sciences Study Section | 1967 | 1978 | |
| Diagnostic Radiology and Nuclear Medicine Study Section | 1979 | 1987 | |
| Diagnostic Radiology Study Section | 1987 | | |
| Disease Control Study Section | 1964 | 1965 | |
| Endocrinology Study Section | 1951 | | |
| Environmental Health Study Section | 1949 | 1953 | |
| Environmental Sciences and Engineering A Study Section | 1965 | 1967 | |
| Environmental Sciences and Engineering B Study Section | 1965 | 1967 | |
| Environmental Sciences and Engineering Study Section | 1960 | 1965 | |
| Environmental Sciences Review Committee | 1966 | 1967 | |
| Epidemiology and Disease Control 1 Study Section* | 1987 | | *Subcommittee |
| Epidemiology and Disease Control 2 Study Section* | 1987 | | *Subcommittee |
| Epidemiology and Disease Control A Study Section* | 1980 | 1987 | *Subcommittee |
| Epidemiology and Disease Control B Study Section* | 1980 | 1987 | *Subcommittee |
| Epidemiology and Disease Control Study Section | 1965 | 1980 | |
| Experimental Cardiovascular Sciences Study Section | 1980 | | |
| Experimental Immunology Study Section | 1980 | | |
| Experimental Psychology A Study Section | 1964 | 1967* | *Transferred to NIMH |
| Experimental Psychology B Study Section | 1964 | 1967 | |
| Experimental Psychology Study Section | 1957 | 1964 | |
| Experimental Therapeutics I Study Section* | 1985 | | *Subcommittee |
| Experimental Therapeutics II Study Section* | 1985 | | *Subcommittee |
| Experimental Therapeutics Study Section | 1972 | 1985 | |
| Experimental Therapeutics Study Section | 1949 | 1953 | |
| Experimental Virology Study Section | 1975 | | |
| Gastroenterology and Clinical Nutrition Study Section | 1980 | 1983 | |
| General Biology and Genetics Fellowships Review Committee | 1966 | 1970 | |
| General Clinical Research Center Committee | 1961 | 1962 | |
| General Medical Research Program-Project Committee | 1961 | 1962 | |
| General Medicine A I Study Section* | 1983 | | *Subcommittee |
| General Medicine A II Study Section* | 1983 | | *Subcommittee |
| General Medicine A Study Section | 1965 | 1983 | |
| General Medicine B Study Section | 1965 | | |
| General Medicine Study Section | 1957 | 1965 | |
| Genetics Study Section | 1958 | | |
| Genome Study Section | 1990 | | |
| Gerontology Study Section | 1946 | 1949 | |
| Health Services Research Study Section | 1960 | 1967* | *Transferred to BHS |
| Hearing Research Study Section | 1982 | | |
| Heart Program-Project Committee | 1961 | 1962 | |
| Hematology I Study Section* | 1982 | | *Subcommittee |
| Hematology II Study Section* | 1982 | | *Subcommittee |
| Hematology Study Section | 1946 | 1982 | |
| History of Life Sciences Study Section | 1962 | 1973 | |
| History of Medicine Study Section | 1960 | 1962 | |
| Hospital Facilities Research Study Section | 1955 | 1960 | |
| Human Development and Aging I Study Section* | 1981 | | *Subcommittee |
| Human Development and Aging II Study Section* | 1981 | | *Subcommittee |
| Human Development and Aging III Study Section* | 1983 | | *Subcommittee |
| Human Development Study Section | 1978 | 1981 | |
| Human Ecology Study Section | 1960 | 1965 | |
| Human Embryology and Development 1 Study Section* | 1991 | | *Subcommittee |

Appendix D (continued)

| Study Section Name | DtEst | DtTm | Comments |
|----------------------------------------------------------------|-------|-------|----------------------|
| Human Embryology and Development 2 Study Section* | 1991 | | *Subcommittee |
| Human Embryology and Development Study Section | 1955 | 1991 | |
| Immunobiology Study Section | 1967 | | |
| Immunological Sciences Study Section | 1975 | | |
| Immunology, Virology and Pathology Study Section | 1989 | | |
| International and Cooperative Projects Study Section | 1989 | | |
| Lung Biology and Pathology Study Section | 1991 | | |
| Malaria Study Section | 1946 | 1949 | |
| Mammalian Genetics Study Section | 1979 | | |
| Medical Biochemistry Study Section | 1990 | | |
| Medical Zoology Study Section | 1953 | 1954 | |
| Medicinal and Organic Chemistry A Fellowships Review Committee | 1966 | 1970 | |
| Medicinal and Organic Chemistry B Fellowships Review Committee | 1966 | 1970 | |
| Medicinal and Organic Chemistry Fellowships Review Committee | 1965 | 1966 | |
| Medicinal and Organic Chemistry Fellowships Review Panel | 1963 | 1965 | |
| Medicinal Chemistry A Study Section | 1962 | 1981 | |
| Medicinal Chemistry B Study Section | 1962 | 1978 | |
| Medicinal Chemistry Study Section | 1960 | 1962 | |
| Mental Health A Study Section | 1962 | 1967* | *Transferred to NIMH |
| Mental Health B Study Section | 1962 | 1967* | *Transferred to NIMH |
| Mental Health Fellowships Review Committee | 1965 | 1967* | *Transferred to NIMH |
| Mental Health Fellowships Review Panel | 1960 | 1965 | |
| Mental Health Program-Project Committee | 1961 | 1962 | |
| Mental Health Study Section | 1946 | 1962 | |
| Metabolic Pathology Study Section | 1986 | | |
| Metabolism and Endocrinology Study Section | 1946 | 1951 | |
| Metabolism and Nutrition Study Section | 1951 | 1959 | |
| Metabolism Study Section | 1959 | | |
| Metallobiochemistry Study Section | 1980 | | |
| Microbial Chemistry Study Section | 1967 | 1980 | |
| Microbial Genetics Study Section | 1979 | 1981 | |
| Microbial Physiology and Genetics A Study Section* | 1982 | | *Subcommittee |
| Microbial Physiology and Genetics B Study Section* | 1982 | | *Subcommittee |
| Microbial Physiology Study Section | 1980 | 1982 | |
| Microbiology and Immunology Study Section | 1949 | 1956 | |
| Microbiology Fellowships Review Committee | 1965 | 1970 | |
| Microbiology Fellowships Review Panel | 1960 | 1965 | |
| Microbiology Study Section | 1980 | 1982 | |
| Microbiology Study Section | 1956 | 1958 | |
| Molecular and Cellular Biophysics Study Section | 1982 | | |
| Molecular Biology Study Section | 1967 | | |
| Molecular Cytology Study Section | 1975 | | |
| Morphology and Genetics Study Section | 1949 | 1958 | |
| Neurological Sciences I Study Section* | 1984 | | *Subcommittee |
| Neurological Sciences II Study Section* | 1984 | | *Subcommittee |
| Neurological Sciences Study Section | 1976 | 1984 | |
| Neurology A Study Section | 1962 | | |
| Neurology B I Study Section* | 1982 | | *Subcommittee |
| Neurology B II Study Section* | 1982 | | *Subcommittee |
| Neurology B Study Section | 1962 | 1982 | |
| Neurology C Study Section | 1984 | | |
| Neurology Field Investigations Study Section | 1957 | 1961 | |
| Neurology Program-Project Committee | 1961 | 1962 | |
| Neurology Study Section | 1953 | 1963 | |
| Nursing Research Study Section | 1987 | | |
| Nursing Research Study Section | 1957 | 1967 | |
| Nutrition Study Section | 1959 | | |
| Oral Biology and Medicine I Study Section* | 1984 | | *Subcommittee |
| Oral Biology and Medicine II Study Section* | 1984 | | *Subcommittee |
| Oral Biology and Medicine Study Section | 1974 | 1984 | |

Appendix D (continued)

| Study Section Name | DtEst | DtTrm | Comments |
|-------------------------------------------------------------|-------|-------|----------------------|
| Organic and Medicinal Chemistry Fellowships Review Panel | 1962 | 1963 | |
| Orthopedics and Musculoskeletal Study Section | 1981 | | |
| Parasitology and Tropical Medicine Study Section | 1954 | 1959 | |
| Pathobiochemistry Study Section | 1982 | | |
| Pathobiological Chemistry Study Section | 1975 | 1982 | |
| Pathology A Study Section | 1961 | | |
| Pathology B Study Section | 1961 | | |
| Pathology Study Section | 1946 | 1961 | |
| Pharmacology A Study Section | 1967 | 1972 | |
| Pharmacology and Endocrinology Fellowships Review Committee | 1965 | 1970 | |
| Pharmacology and Endocrinology Fellowships Review Panel | 1960 | 1965 | |
| Pharmacology and Experimental Therapeutics A Study Section | 1965 | 1967 | |
| Pharmacology and Experimental Therapeutics B Study Section | 1965 | 1967 | |
| Pharmacology and Experimental Therapeutics Study Section | 1953 | 1965 | |
| Pharmacology B Study Section | 1967 | 1972 | |
| Pharmacology Study Section | 1972 | | |
| Pharmacology Study Section | 1946 | 1953 | |
| Physical Biochemistry Study Section | 1980 | | |
| Physiological Chemistry Study Section | 1959 | | |
| Physiology Fellowships Review Committee | 1965 | 1970 | |
| Physiology Fellowships Review Panel | 1962 | 1967 | |
| Physiology Study Section | 1946 | | |
| Population Research Study Section | 1971 | 1977 | |
| Primate Research Study Section | 1960 | 1964 | |
| Psychological Sciences Fellowships Review Committee | 1965 | 1967* | *Transferred to NIMH |
| Psychological Sciences Fellowships Review Panel | 1960 | 1965 | |
| Psychopharmacology Study Section | 1959 | 1967* | *Transferred to NIMH |
| Public Health and Nursing Study Section | 1955 | 1957 | |
| Public Health and Sanitation Study Section | 1953 | 1955 | |
| Public Health Research Study Section | 1957 | 1960 | |
| Public Health Study Section | 1946 | 1953 | |
| Radiation Study Section | 1955 | | |
| Radiobiology Study Section | 1946 | 1949 | |
| Reproductive Biology Study Section | 1965 | | |
| Reproductive Endocrinology Study Section | 1985 | | |
| Respiratory and Applied Physiology Study section | 1983 | | |
| Sanitation Study Section | 1946 | 1949 | |
| Sanitary Engineering and Occupational Health Study Section | 1955 | 1960 | |
| Sensory Diseases Study Section | 1951 | 1962 | |
| Sensory Disorders and Language Study Section | 1962 | | |
| Social Sciences and Population Study Section | 1977 | | |
| Surgery A Study Section | 1961 | 1977 | |
| Surgery and Bioengineering Study Section | 1977 | | |
| Surgery B Study Section | 1961 | 1977 | |
| Surgery Study Section | 1946 | 1961 | |
| Surgery, Anesthesiology, and Trauma Study Section | 1977 | | |
| Syphilis Study Section | 1946 | 1949 | |
| Toxicology I Study Section* | 1990 | | *Subcommittee |
| Toxicology II Study Section* | 1990 | | *Subcommittee |
| Toxicology Study Section | 1958 | 1990 | |
| Tropical Diseases Study Section | 1946 | 1949 | |
| Tropical Medicine and Parasitology Study Section | 1959 | | |
| Tropical Medicine Study Section | 1949 | 1953 | |
| Tuberculosis Study Section | 1946 | 1949 | |
| Virology and Rickettsiology Study Section | 1958 | 1969 | |
| Virology Study Section | 1969 | | |
| Virus and Rickettsial Study Section | 1946 | 1953 | |
| Visual Disorders Study Section | 1982 | 1983 | |
| Visual Sciences A I Study Section* | 1982 | 1991 | *Subcommittee |
| Visual Sciences A II Study Section* | 1982 | 1991 | *Subcommittee |

Appendix D (concluded)

| Study Section Name | DtEst | DtTm | Comments |
|---------------------------------|-------|------|----------|
| Visual Sciences A Study Section | 1972 | 1983 | |
| Visual Sciences A Study Section | 1991 | | |
| Visual Sciences B Study Section | 1972 | | |
| Visual Sciences C Study Section | 1991 | | |
| Visual Sciences Study Section | 1962 | 1972 | |

Appendix E

DRG Study Section Executive Secretaries, 1946 – 1995

Listings for chartered study sections and their subcommittees are from *Members of Advisory Groups of the National Institutes of Health, 1946 – 1961*; *Members of Advisory Groups of the National Institutes of Health, 1961 – January 1, 1967*; *NIH Advisory Committees and Electronic Roster* for 1994 through June 1995, as are listings for fellowship review committees, beginning in 1961. Listings for unchartered and special study sections for 1958 – 1989 are from *NIH Scientific Directory and Annual Bibliography*. Information on special study sections, 1990 – 1995, is from the Technology and Applied Sciences Review Section, Referral and Review Branch. Additional information on subcommittees in Manpower Review (1981 – 1987) is from the Manpower Review Office files. Information on the Manpower Review Office is incomplete. Institute review groups are excluded.

Appendix E

| Exec | Study Section Name | Term |
|--------------------------|----------------------------------------------------------|---------|
| Aaslestad, Dr. Halvor G. | Special Study Section | 1977-79 |
| Aaslestad, Dr. Halvor G. | Mammalian Genetics Study Section | 1979-81 |
| Abedin, Dr. Zain-Ul | Molecular Biology Study Section | 1986-90 |
| Abedin, Dr. Zain-Ul | Biomedical Sciences 6 Study Section | 1986 |
| Aborn, Dr. Murray | Behavioral Sciences Study Section | 1959-62 |
| Aborn, Dr. Murray | Mental Health Study Section | 1958-59 |
| Abrahams, Dr. Simon P. | History of Life Sciences Study Section | 1966-67 |
| Abrahams, Dr. Simon P. | Special Study Section | 1966-69 |
| Abramson, Dr. Samuel | Surgery and Bioengineering Study Section | 1982-83 |
| Abramson, Dr. Samuel | Tropical Medicine and Parasitology Study Section | 1956-58 |
| Abramson, Dr. Samuel | Allergy and Immunology Study Section | 1956 |
| Abramson, Dr. Samuel | Bacteriology and Mycology Study Section | 1958-62 |
| Alavanja, Dr. Michael | Epidemiology and Disease Control A Study Section | 1981-83 |
| Alfred, Dr. Lawrence | Special Study Section | 1984-86 |
| Amir, Dr. Syed M. | Biomedical Sciences 6 Study Section | 1988-89 |
| Amir, Dr. Syed M. | Endocrinology Study Section | 1992- |
| Amir, Dr. Syed M. | Biological Sciences 2 Study Section | 1989-93 |
| Amir, Dr. Syed M. | Biomedical Sciences Study Section | 1987-88 |
| Anand, Dr. Rita | Virology Study Section | 1992- |
| Angelone, Dr. Luis | Hematology Study Section | 1965-67 |
| Appel, Dr. Frederick W. | Allergy and Immunology Study Section | 1957-64 |
| Appel, Dr. Frederick W. | Experimental Therapeutics Study Section | 1951-53 |
| Appel, Dr. Frederick W. | Allergy and Immunology A Study Section | 1964-70 |
| Appel, Dr. Frederick W. | Committee on Standards for Grants Surveys | 1952-54 |
| Appel, Dr. Frederick W. | Public Health Study Section | 1951-53 |
| Appel, Dr. Frederick W. | Pharmacology and Experimental Therapeutics Study Section | 1953-55 |
| Appel, Dr. Frederick W. | Cancer Chemotherapy Study Section | 1956 |
| Archer, Dr. Ellen G. | Pathobiological Chemistry Study Section | 1977-80 |
| Arnott, Dr. Peter | Psychological Sciences Fellowships Review Panel | 1963-65 |
| Arnott, Dr. Peter | Psychological Sciences Fellowships Review Committee | 1965-67 |
| Atchley, Dr. Floyd O. | Cardiovascular B Study Section | 1965-73 |
| Atchley, Dr. Floyd O. | Cardiovascular and Renal Study Section | 1973-77 |
| Atkinson, Dr. Joe W. | Primate Research Study Section | 1963-64 |
| Atkinson, Dr. Joe W. | Surgery B Study Section | 1961-77 |
| Atkinson, Dr. Joe W. | Surgery and Bioengineering Study Section | 1977-82 |
| Backus, Dr. Robert C. | Cell Biology B Study Section | 1966-67 |
| Bahor, Dr. Raymond E. | Toxicology Study Section | 1978-81 |
| Bailey, Dr. Clark J. | Mental Health Study Section | 1960-61 |
| Bailey, Mr. Daniel | Biomedical Communications Study Section | 1962-64 |
| Baker, Dr. Charles | Biomedical Sciences Study Section | 1989-94 |
| Baker, Dr. Charles | Biomedical Sciences 4 Study Section | 1984-89 |
| Baker, Dr. Charles | Biomedical Sciences Study Section | 1981-84 |
| Baker, Dr. Charles | Biomedical Sciences 2 Study Section | 1986-89 |
| Baker, Dr. Charles | Biomedical Sciences 3 Study Section | 1984-86 |
| Baker, Dr. Houston | Pathology A Study Section | 1988-90 |
| Baker, Dr. Houston | Special Study Section | 1986- |
| Banner, Dr. Carl D. B. | Neurological Sciences I Study Section | 1994- |
| Baron, Dr. Seymour H. | Experimental Psychology Study Section | 1961-65 |
| Baron, Dr. Seymour H. | Experimental Psychology A Study Section | 1965-67 |
| Barron, Dr. George | Nutrition Study Section | 1961-63 |
| Bartos, Dr. Edwin M. | Special Study Section | 1976-77 |
| Bartos, Dr. Edwin M. | Neurological Sciences Study Section | 1977-84 |
| Behar, Dr. Marjam | Metallobiochemistry Study Section | 1980-84 |
| Behar, Dr. Marjam | Special Study Section | 1985- |
| Beisler, Dr. John | Metallobiochemistry Study Section | 1984-87 |
| Beisler, Dr. John | Biophysical Chemistry Study Section | 1990- |
| Beikun, Dr. Morris | Cancer Program-Project Committee | 1961-62 |
| Bender, Dr. Maunce | Cancer Chemotherapy Study Section | 1959-60 |
| Bengali, Dr. Zakir | Pathobiology Study Section | 1988- |
| Berman, Mr. Howard | Allergy and Immunology Study Section | 1989- |

Appendix E

| Exec | Study Section Name | Term |
|-----------------------------|-------------------------------------------------------------|------------------|
| Bhorjee, Dr. Jaswant S. | Pathology A Study Section | 1990-95 |
| Birnbaum, Dr. Sanford M. | Biochemistry Study Section | 1963-73 |
| Bolduan, Dr. Orvil E. A. | Visual Sciences A I Study Section | 1983-84 |
| Bolduan, Dr. Orvil E. A. | Visual Sciences A Study Section | 1973-83 |
| Bourke, Dr. Anne R. | Cancer Chemotherapy Study Section | 1963-65 |
| Bourke, Dr. Anne R. | Pharmacology and Experimental Therapeutics B Study Section | 1965-72 |
| Bourke, Dr. Anne R. | Experimental Therapeutics Study Section | 1972-81 |
| Bradley, Dr. Eileen | Special Study Section | 1990- |
| Branche, Dr. William C. | Bacteriology and Mycology II Study Section | 1981- |
| Branche, Dr. William C. | Microbiology Study Section | 1980-81 |
| Branche, Dr. William C. | Bacteriology and Mycology B Study Section | 1981-86 |
| Brand, Dr. Jeanne | History of Medicine Study Section | 1959-62 |
| Bratzel, Mr. Richard P. | Special Study Section | 1967-72, 1979-88 |
| Bratzel, Mr. Richard P. | Medicinal Chemistry B Study Section | 1972-78 |
| Bratzel, Mr. Richard P. | Bioanalytical and Metallobiochemistry Study Section | 1977-79 |
| Brodie, Dr. Harry J. | Physiological Chemistry Study Section | 1978-85 |
| Brodie, Dr. Harry J. | Endocrinology Study Section | 1985-92 |
| Brunstetter, Dr. Byron C. | Pathology Study Section | 1949-53 |
| Brunstetter, Dr. Byron C. | Arthritis and Rheumatism Study Section | 1949-50 |
| Brunstetter, Dr. Byron C. | Hematology Study Section | 1951-53 |
| Bunnag, Dr. Bill | Special Study Section | 1991- |
| Buren, Dr. William F. | Special Study Section | 1965-66 |
| Burrous, Dr. Stanley | Special Study Section | 1978-85 |
| Burrous, Dr. Stanley | Physiological Chemistry Study Section | 1985-90 |
| Bynum, Ms. Barbara S. | Special Study Section | 1973-75 |
| Bynum, Ms. Barbara S. | Pathology B Study Section | 1975-77 |
| Cain, Dr. Dennis F. | Special Study Section | 1974-78 |
| Caroli, Dr. Vincent J. | Cardiovascular and Pulmonary Study Section | 1976-79 |
| Calhoun, Dr. Faye J. | Toxicology Study Section | 1981-87 |
| Campbell, Ms. Carol A. | Population Research Study Section | 1971-77 |
| Campbell, Ms. Carol A. | Behavioral Sciences Study Section | 1990- |
| Campbell, Ms. Carol A. | Social Sciences and Population Study Section | 1977-90 |
| Carpenter, Dr. Genevieve C. | Mental Health Fellowships Review Committee | 1965-66 |
| Carpenter, Dr. Genevieve C. | Mental Health Fellowships Review Panel | 1963-65 |
| Cassatt, Dr. James C. | Biophysics and Biophysical Chemistry A Study Section | 1979-82 |
| Cassatt, Dr. James C. | Biophysics and Biophysical Chemistry B Study Section | 1978-79 |
| Cassatt, Dr. James C. | Molecular and Cellular Biophysics Study Section | 1981-82 |
| Cassedy, Dr. James A. | History of Life Sciences Study Section | 1962-66 |
| Chalkley, Dr. Donald T. | Pathology A Study Section | 1962-65 |
| Chalkley, Dr. Donald T. | Reproductive Biology Study Section | 1966-67 |
| Chalkley, Dr. Donald T. | Pathology B Study Section | 1962-64 |
| Chalkley, Dr. Donald T. | Pathology Study Section | 1959-62 |
| Chananie, Dr. Joel D. | Special Study Section | 1985-90 |
| Chen, Dr. Priscilla | Oral Biology and Medicine II Study Section | 1992- |
| Chopra, Dr. Harish C. | Special Study Section | 1977- |
| Chung, Dr. Anthony C. | Cardiovascular and Renal Study Section | 1990- |
| Chung, Dr. Anthony C. | Cardiovascular and Pulmonary Study Section | 1982-90 |
| Clark, Dr. Anne P. | Lung Biology and Pathology Study Section | 1991- |
| Clausen, Dr. Harry J. | Anatomy and Pathology Fellowships Review Panel | 1963-65 |
| Clausen, Dr. Harry J. | Pharmacology and Endocrinology Fellowships Review Committee | 1965-66 |
| Clausen, Dr. Harry J. | Anatomy and Pathology Fellowships Review Committee | 1965-70 |
| Clausen, Dr. Harry J. | Physiology Fellowships Review Committee | 1966-67 |
| Clausen, Dr. Harry J. | Anatomy and Physiology Fellowships Review Panel | 1961-63 |
| Cole, Dr. Berwin A. | Microbiology Study Section | 1956-57 |
| Cole, Dr. Berwin A. | Microbiology and Immunology Study Section | 1955-56 |
| Cole, Dr. Berwin A. | Tropical Medicine and Parasitology Study Section | 1955 |
| Conant, Dr. Robert A. | Pathology A Study Section | 1982-84 |
| Conner, Dr. Mark | Dental Study Section | 1960 |
| Copeland, Dr. D. E. | Morphology and Genetics Study Section | 1956-58 |
| Copeland, Dr. D. E. | Cell Biology Study Section | 1958-59 |

Appendix E (continued)

| Exec | Study Section Name | Term |
|----------------------------|-----------------------------------------------------------------|------------------|
| Copeland, Dr. Edmund S. | Pathology B Study Section | 1978-79 |
| Copeland, Dr. Edmund S. | Special Study Section | 1976-78 |
| Copeland, Dr. Edmund S. | Chemical Pathology Study Section | 1979- |
| Corning, Miss Mary E. | Biomedical Communications Study Section | 1964-66 |
| Corsaro, Dr. Cheryl M. | Special Study Section | 1985-89 |
| Corsaro, Dr. Cheryl M. | Human Genome Study Section | 1989- |
| Critz, Dr. Jerry | Physiological Chemistry Study Section | 1990- |
| Cuca, Ms. Janet M. | Behavioral and Neurosciences 4 Study Section | 1985 |
| Cuca, Ms. Janet M. | Behavioral and Neurosciences 1 Study Section | 1985-88 |
| Cuca, Ms. Janet M. | Special Study Section | 1988-89 |
| Cuca, Ms. Janet M. | Behavioral and Neurosciences 2 Study Section | 1986-88 |
| Cuca, Ms. Janet M. | Behavioral and Neurosciences 3 Study Section | 1985-88 |
| Culbertson, Dr. James T. | Microbiology and Immunology Study Section | 1949-50 |
| Culbertson, Dr. James T. | Bacteriology Study Section | 1949 |
| Culbertson, Dr. James T. | Virus and Rickettsial Study Section | 1948-50 |
| Dalton, Dr. John C. | Metabolism Study Section | 1962-65 |
| Dalton, Dr. John C. | Applied Physiology Study Section | 1969-70 |
| Dalton, Dr. John C. | Applied Physiology Study Section | 1963-64, 1966-67 |
| Darby, Dr. Eleanor M. K. | Committee on Standards for Grants Surveys | 1955 |
| Darby, Dr. Eleanor M. K. | Gerontology Study Section | 1949 |
| Darby, Dr. Eleanor M. K. | Public Health and Nursing Study Section | 1955-57 |
| Darby, Dr. Eleanor M. K. | Cardiovascular Study Section | 1949-57 |
| Davidson, Dr. Harold M. | Arthritis and Metabolic Diseases Program-Project Committee | 1961-73 |
| Davidson, Dr. Harold M. | Gastroenterology and Clinical Nutrition Study Section | 1980-81 |
| Davidson, Dr. Harold M. | General Medicine A I Study Section | 1983- |
| Davidson, Dr. Harold M. | General Medicine A Study Section | 1973-83 |
| Davis, Dr. William F., Jr. | General Medicine B Study Section | 1972-81 |
| Day, Dr. Camilla | Biological Sciences 3 Study Section | 1992-93 |
| Day, Dr. Camilla | Biological Sciences 2 Study Section | 1993- |
| Dean, Dr. Donna J. | Gastroenterology and Clinical Nutrition | 1982-83 |
| Dean, Dr. Donna J. | General Medicine A II Study Section | 1983-87 |
| Dearry, Dr. Allen | Visual Sciences C Study Section | 1991-92 |
| Dearry, Dr. Allen | Visual Sciences A II Study Section | 1990-91 |
| Delappe, Dr. Irving P. | Microbiology Fellowships Review Panel | 1961-62 |
| Dhindsa, Dr. Dharam S. | Reproductive Biology Study Section | 1975-93 |
| Dhindsa, Dr. Dharam S. | Special Study Section | 1993- |
| Disque, Dr. Donald T. | Molecular Biology Study Section | 1973-87 |
| Doukas, Dr. Harry M. | Medicinal and Organic Chemistry Fellowships Review Committee | 1965-66 |
| Doukas, Dr. Harry M. | Biochemistry and Molecular Biology Fellowships Review Committee | 1969-70 |
| Dreguss, Dr. Miklos N. | Hematology Study Section | 1961-64 |
| Dubois, Dr. Ronald J. | Medicinal Chemistry Study Section | 1981- |
| Dubois, Dr. Ronald J. | Medicinal Chemistry A Study Section | 1978-81 |
| Duncan, Dr. Katherine | Clinical Research Fellowships Review Panel | 1961-65 |
| Duncan, Dr. Katherine | Clinical Research Fellowships Review Committee | 1965-70 |
| Dupree, Dr. Sherry L. | Human Embryology and Development 2 Study Section | 1994- |
| Eaves, Dr. George N. | Molecular Biology Study Section | 1967-70, 1971-73 |
| Eberhart, Dr. John C. | Mental Health Study Section | 1951-54 |
| Ehrenspeck, Dr. Gerhard | Cellular Biology and Physiology II Study Section | 1987- |
| Ellis, Dr. J. Marshall | Morphology and Genetics Study Section | 1950-51 |
| Ellis, Dr. J. Marshall | Tropical Medicine and Parasitology Study Section | 1949-51 |
| Ellis, Dr. J. Marshall | Surgery Study Section | 1949-56 |
| Eskinazi, Dr. Daniel P. | Biomedical Sciences 7 Study Section | 1986-88 |
| Eskinazi, Dr. Daniel P. | Biomedical Sciences 1 Study Section | 1985-88 |
| Eskinazi, Dr. Daniel P. | Biomedical Sciences 2 Study Section | 1985-86 |
| Eveleth, Dr. Phyllis B. | Epidemiology and Disease Control II Study Section | 1984-87 |
| Feldman, Dr. F. M. | Tuberculosis Study Section | 1949 |
| Fisher, Dr. Earl, Jr. | Pathology B Study Section | 1979-81 |
| Fisher, Dr. Earl, Jr. | Visual Sciences B Study Section | 1984-89 |
| Fisher, Dr. Earl, Jr. | Special Study Section | 1977-79 |
| Fisher, Dr. Witton M. | General Medicine Study Section | 1963-65 |

Appendix E (continued)

| Exec | Study Section Name | Term |
|-----------------------------|------------------------------------------------------------|---------|
| Fisher, Dr. Wilton M. | General Medicine A Study Section | 1965-73 |
| Fitch, Dr. Kenneth | Special Study Section | 1989-90 |
| Fournelle, Dr. Harold J. | Microbiology Fellowships Review Panel | 1962-65 |
| Fournelle, Dr. Harold J. | Microbiology Fellowships Review Committee | 1965-70 |
| Frank, Dr. Martin | Physiology Study Section | 1978-85 |
| Fredericks, Ms. Joan D. | Biomedical Sciences Study Section | 1981-85 |
| Fredericks, Ms. Joan D. | Special Study Section | 1985-88 |
| Freeman, Dr. Frank E. | Mental Health B Study Section | 1962-64 |
| Fried, Dr. Jerrold | Pathology B Study Section | 1987-89 |
| Fried, Dr. Jerrold | Hematology II Study Section | 1989- |
| Friedlander, Dr. Harold | Dental Study Section | 1962-72 |
| Friedlander, Dr. Herbert D. | Hematology Study Section | 1954 |
| Friedlander, Dr. Herbert D. | Pathology Study Section | 1954-55 |
| Friedman, Dr. Mischa E. | Allergy and Immunology Study Section | 1970-76 |
| Fuhr, Dr. Irvin | Biophysics and Biophysical Chemistry Study Section | 1955-66 |
| Fuhr, Dr. Irvin | Biochemistry Study Section | 1951-55 |
| Fuhr, Dr. Irvin | Biophysics and Biophysical Chemistry A Study Section | 1966-79 |
| Fuhr, Dr. Irvin | Biochemistry and Nutrition Study Section | 1948-51 |
| Fuhr, Dr. Irvin | Dental Study Section | 1948-50 |
| Gary, Dr. Norman | Special Study Section | 1971-74 |
| Gaylord, Dr. Clarice E. | Pathobiological Chemistry Study Section | 1980-84 |
| Gee, Dr. Helen H. | Computer and Biomathematical Sciences Study Section | 1970-72 |
| Gee, Dr. Helen H. | Computer Research Study Section | 1965-70 |
| Gerring, Mr. Irving | Public Health and Sanitation Study Section | 1953-55 |
| Gerring, Mr. Irving | Radiation Study Section | 1955-57 |
| Gerring, Mr. Irving | Tropical Medicine and Parasitology Study Section | 1951-55 |
| Gerring, Mr. Irving | Environmental Health Study Section | 1948-53 |
| Gerring, Mr. Irving | Environmental Sciences and Engineering Study Section | 1960-65 |
| Gerring, Mr. Irving | Sanitary Engineering and Occupational Health Study Section | 1955-60 |
| Gerring, Mr. Irving | Special Study Section | 1967-72 |
| Gerring, Mr. Irving | Environmental Sciences and Engineering A Study Section | 1965-67 |
| Gerring, Mr. Irving | Public Health Study Section | 1949-50 |
| Giacometti, Dr. Luigi | Visual Sciences A I Study Section | 1984-89 |
| Giacometti, Dr. Luigi | Visual Sciences B Study Section | 1977-84 |
| Giacometti, Dr. Luigi | Behavioral and Neurosciences 2 Study Section | 1989-93 |
| Giacometti, Dr. Luigi | Behavioral and Neurosciences 1 Study Section | 1989-93 |
| Giacometti, Dr. Luigi | Visual Sciences A Study Section | 1993- |
| Gobel, Dr. Stephen | Neurological Sciences II Study Section | 1985- |
| Gold, Dr. Norman I. | Reproductive Biology Study Section | 1978-79 |
| Gold, Dr. Norman I. | Biochemical Endocrinology Study Section | 1979-87 |
| Goldsmith, Dr. Margaret T. | Cardiovascular A Study Section | 1965-70 |
| Goldsmith, Dr. Margaret T. | Cardiovascular Study Section | 1963-65 |
| Goldwater, Dr. William H. | Metabolism Study Section | 1959-61 |
| Goolsby, Dr. Charles | Cardiovascular and Renal Study Section | 1978-79 |
| Gordon, Dr. Milton | Bacteriology and Mycology Study Section | 1970-81 |
| Gordon, Dr. Milton | Bacteriology and Mycology I Study Section | 1986-87 |
| Gordon, Dr. Milton | Bacteriology and Mycology A Study Section | 1981-86 |
| Gordon, Dr. Mordecai | Mental Health A Study Section | 1961-63 |
| Gordon, Dr. Mordecai | Mental Health Study Section | 1961-62 |
| Gottlieb, Dr. Melvin | Biomedical Sciences 6 Study Section | 1986-88 |
| Graff, Mr. Morris M. | Endocrinology Study Section | 1961-85 |
| Greenhouse, Dr. Gerald A. | Cellular Biology and Physiology I Study Section | 1983- |
| Greenhouse, Dr. Gerald A. | Cell Biology Study Section | 1977-83 |
| Greenhouse, Dr. Gerald A. | Cellular Physiology Study Section | 1979-82 |
| Grossnickle, Dr. Thurman | Medicinal Chemistry B Study Section | 1964-72 |
| Gulyas, Dr. Bela | Reproductive Endocrinology Study Section | 1985-88 |
| Gutter, Mr. Frederick J. | Communicative Sciences Study Section | 1962-78 |
| Haliasz, Dr. Michael F. | Communicative Sciences Study Section | 1978-82 |
| Haliasz, Dr. Michael F. | Sensory Disorders and Language Study Section | 1982-90 |
| Hall, Dr. Samuel R. | Endocrinology Study Section | 1951-56 |

Appendix E (continued)

| Exec | Study Section Name | Term |
|-----------------------------|----------------------------------------------------------------|---------|
| Hall, Dr. Samuel R. | Metabolism and Endocrinology Study Section | 1949-51 |
| Hall, Dr. Samuel R. | Pathology Study Section | 1949 |
| Halpin, Dr. Evelyn H. | Accident Prevention Research Study Section | 1961-63 |
| Halpin, Dr. Evelyn H. | Human Ecology Study Section | 1964-65 |
| Hamel, Dr. Alfred | Pharmacology and Endocrinology Fellowships Review Committee | 1970 |
| Hamilton, Dr. Clara E. | Physiology Study Section | 1956-78 |
| Harris, Dr. Marvin M. | Bacteriology and Mycology A Study Section | 1964-70 |
| Harris, Dr. Marvin M. | Bacteriology and Mycology Study Section | 1962-64 |
| Hayden, Dr. Betty | Immunobiology Study Section | 1992- |
| Hayes, Dr. Joseph E., Jr. | Hematology Study Section | 1971-77 |
| Hayunga, Dr. Eugene | Special Study Section | 1990-94 |
| Headley, Mr. F. Gene | Biomedical Sciences 3 Study Section | 1986-89 |
| Headley, Mr. F. Gene | Biomedical Sciences 7 Study Section | 1985-86 |
| Headley, Mr. F. Gene | Special Study Section | 1983-84 |
| Headley, Mr. Gene F. | Behavioral and Neurosciences 1 Study Section | 1985 |
| Heinrich, Dr. Max A. | Medicinal and Organic Chemistry Fellowships Review Committee | 1963-65 |
| Held, Dr. Victor M. | General Biology and Genetics Fellowships Review Committee | 1965-67 |
| Held, Dr. Victor M. | Physiology Fellowships Review Committee | 1965-66 |
| Held, Dr. Victor M. | Physiology Fellowships Review Panel | 1963-65 |
| Helvig, Dr. Raymond | Surgery A Study Section | 1959-76 |
| Hemphill, Dr. F. M. | Advisory Committee on Computers in Research | 1960-61 |
| Henry, Dr. Timothy J. | Bacteriology and Mycology I Study Section | 1987- |
| Herman, Dr. Samuel | Radiation Study Section | 1959-61 |
| Hesselbach, Dr. Marie L. | Biochemistry and Nutrition Fellowships Review Committee | 1969-70 |
| Hesselbach, Dr. Marie L. | Biochemistry and Nutrition Fellowships Review Committee | 1965-66 |
| Hesselbach, Dr. Marie L. | Biochemistry and Nutrition A Fellowship Review Committee | 1966-69 |
| Hester, Dr. James J. | Behavioral Sciences B Fellowships Review Committee | 1965-66 |
| Hickman, Dr. Jean | Tropical Medicine and Parasitology Study Section | 1985- |
| Hill, Dr. Robert T. | Dental Study Section | 1958-59 |
| Hill, Dr. Robert T. | Allergy and Infectious Diseases Program-Project Committee | 1961-62 |
| Hill, Dr. Robert T. | Endocrinology Study Section | 1956-60 |
| Hill, Dr. Robert T. | Reproductive Biology Study Section | 1967-75 |
| Himmelsbach, Dr. Clifton K. | Radiation Study Section | 1957 |
| Himmelsbach, Dr. Clifton K. | General Medicine Study Section | 1957 |
| Hoffeld, Dr. Terrell J. | Oral Biology and Medicine I Study Section | 1985-91 |
| Hoffeld, Dr. Terrell J. | Oral Biology and Medicine II Study Section | 1985-91 |
| Horenstein, Dr. Betty R. | Experimental Psychology Study Section | 1968-61 |
| Horenstein, Dr. Evelyn A. | Hematology Study Section | 1968-69 |
| Horenstein, Dr. Evelyn A. | Cellular Biology and Physiology II Study Section | 1983-87 |
| Horenstein, Dr. Evelyn A. | Cell Biology Study Section | 1969-77 |
| Horenstein, Dr. Evelyn A. | Applied Physiology Study Section | 1967-69 |
| Hove, Dr. Edwin L. | Metabolism and Nutrition Study Section | 1956-59 |
| Hoversland, Dr. Arthur S. | Human Embryology and Development Study Section | 1978-95 |
| Hu, Dr. Jane H. | Visual Sciences A II Study Section | 1983-89 |
| Hu, Dr. Jane H. | Visual Sciences A Study Section | 1978-79 |
| Hu, Dr. Jane H. | Visual Disorders Study Section | 1982-83 |
| Hu, Dr. Jane H. | Sensory Disorders and Language Study Section | 1990- |
| Hurst, Dr. M. Wayne | Blood Research Study Section | 1982-83 |
| Huttrir, Dr. Charles P. | Morphology and Genetics Study Section | 1954-55 |
| Huttrir, Dr. Charles P. | Physiology Study Section | 1952-55 |
| Huttrir, Dr. Charles P. | Sensory Diseases Study Section | 1952-53 |
| Hyatt, Dr. Asher A. | Medicinal and Organic Chemistry B Fellowships Review Committee | 1966-67 |
| Hyatt, Dr. Asher A. | Molecular and Cellular Biophysics Study Section | 1991 |
| Hyatt, Dr. Asher A. | Medicinal and Organic Chemistry A Fellowships Review Committee | 1966-69 |
| Hyatt, Dr. Asher A. | Medicinal Chemistry A Study Section | 1969-78 |
| Ingram, Dr. Robert L. | Biochemistry and Nutrition B Fellowship Review Committee | 1966-69 |
| Ingram, Dr. Robert L. | Physiological Chemistry Study Section | 1969-78 |
| Irwin, Dr. David | Biomedical Sciences 6 Study Section | 1984-86 |
| Jackson, Dr. Ethel B. | Dental Study Section | 1972-74 |
| Jakubczak, Dr. Leonard | Visual Sciences B Study Section | 1989- |

Appendix E (continued)

| Exec | Study Section Name | Term |
|----------------------------|----------------------------------------------------------------|---------|
| Jakus, Dr. Marie A. | Visual Sciences A Study Section | 1972-73 |
| Jakus, Dr. Marie A. | Visual Sciences B Study Section | 1972-77 |
| Jakus, Dr. Marie A. | Visual Sciences Study Section | 1962-72 |
| James, Dr. John C. | Medicinal and Organic Chemistry A Fellowships Review Committee | 1969 |
| James, Dr. John C. | Medicinal and Organic Chemistry B Fellowships Review Committee | 1967-70 |
| Jeffrey, Dr. Helen L. | Biochemistry Study Section | 1958-63 |
| Jeffrey, Dr. Helen L. | Medicinal Chemistry A Study Section | 1962-64 |
| Jeffrey, Dr. Helen L. | Medicinal Chemistry B Study Section | 1962-64 |
| Jeffrey, Dr. Helen L. | Medicinal Chemistry Study Section | 1960-62 |
| Jelsema, Dr. Carole L. | Visual Sciences C Study Section | 1992- |
| Johansson, Dr. Karl R. | Virology and Rickettsiology Study Section | 1960-61 |
| Johansson, Dr. Karl R. | Virology and Rickettsiology Study Section | 1966-69 |
| Johnson, Dr. Gordon L. | Cardiovascular Study Section | 1990- |
| Johnson, Dr. Gordon L. | Cardiovascular and Pulmonary Study Section | 1988-90 |
| Johnson, Dr. Sharon | Pathobiochemistry Study Section | 1984-86 |
| Jones, Dr. Lynwood A., Jr. | Clinical Sciences A Study Section | 1979-83 |
| Jones, Dr. Lynwood A., Jr. | Clinical Sciences B Study Section | 1979-80 |
| Jones, Dr. Lynwood A., Jr. | Clinical Sciences C Study Section | 1979-83 |
| Jones, Dr. Lynwood A., Jr. | Clinical Sciences 1 Study Section | 1983-89 |
| Jones, Dr. Lynwood A., Jr. | Clinical Sciences 3 Study Section | 1983-89 |
| Jones, Dr. Lynwood A., Jr. | Immunology, Virology, and Pathology Study Section | 1989- |
| Jones, Dr. W. Barrie G. | Special Study Section | 1981-82 |
| Jones, Dr. W. Barrie G. | Clinical Sciences D Study Section | 1980-81 |
| Jost, Dr. Patricia | Molecular and Cellular Biophysics Study Section | 1987-91 |
| Kaiser, Dr. Joseph A. | Pharmacology Study Section | 1974- |
| Kaiser, Dr. Joseph A. | Pharmacology and Endocrinology Fellowships Review Committee | 1966-70 |
| Karel, Dr. Leonard | Radiobiology Study Section | 1949 |
| Karel, Dr. Leonard | Antibiotics Study Section | 1948-49 |
| Karel, Dr. Leonard | Dental Study Section | 1951 |
| Karel, Dr. Leonard | Pharmacology Study Section | 1949-51 |
| Karel, Dr. Leonard | Committee on Sectional Research in Microbiology | 1955 |
| Karel, Dr. Leonard | Hematology Study Section | 1949-50 |
| Katz, Dr. Martin | Psychopharmacology Study Section | 1959 |
| Keefler, Dr. Garrett V. | Experimental Virology Study Section | 1984- |
| Keiles, Dr. Elsa O. | Metabolism and Nutrition Study Section | 1951-55 |
| Keiles, Dr. Elsa O. | Human Embryology and Development Study Section | 1955 |
| Keiles, Dr. Elsa O. | Nutrition Study Section | 1959 |
| Keiles, Dr. Elsa O. | Pharmacology Study Section | 1952-53 |
| Keiles, Dr. Elsa O. | Committee on Radiation Studies | 1954-55 |
| Keiles, Dr. Elsa O. | Cell Biology Study Section | 1960-61 |
| Kelsey, Dr. Morris | Experimental Therapeutics I Study Section | 1986-89 |
| Kelsey, Dr. Morris | Experimental Therapeutics Study Section | 1985-86 |
| Kelty, Dr. Miriam F. | Human Development Study Section | 1979-80 |
| Ketchel, Dr. Melvin | Special Study Section | 1981-95 |
| Ketley, Dr. Jeanne N. | Physical Biochemistry Study Section | 1980-85 |
| Khan, Dr. Mushtaq A. | General Medicine A II Study Section | 1989- |
| Kim, Dr. Sooja | Epidemiology and Disease Control I Study Section | 1987-91 |
| Kim, Dr. Sooja | Nutrition Study Section | 1991- |
| Kimm, Dr. Joseph | Hearing Research Study Section | 1983- |
| King, Dr. Richard | Biological Sciences 1 Study Section | 1989-93 |
| Kline, Dr. Ira | Special Study Section | 1979-83 |
| Kline, Dr. Ira | Experimental Therapeutics Study Section | 1981-85 |
| Knecht, Dr. Michael | Biochemical Endocrinology Study Section | 1988- |
| Kornfeld, Dr. Lottie | Special Study Section | 1974-75 |
| Kornfeld, Dr. Lottie | Immunological Sciences Study Section | 1975-85 |
| Kraner, Dr. Keith L. | Surgery A Study Section | 1976-77 |
| Kraner, Dr. Keith L. | Surgery, Anesthesiology, and Trauma Study Section | 1977- |
| Krishnan, Dr. Krish | Metabolism Study Section | 1986- |
| Kyle, Dr. Wendell H. | Molecular Biology Study Section | 1970-71 |
| Kyle, Dr. Wendell H. | Special Study Section | 1974-75 |

Appendix E (continued)

| Exec | Study Section Name | Term |
|-----------------------------|-----------------------------------------------------------|------------------|
| Kyle, Dr. Wendell H. | Cardiovascular and Pulmonary Research A Study Section | 1971-74 |
| Kyle, Dr. Wendell H. | Molecular Cytology Study Section | 1975-78 |
| Kyle, Dr. Wendell H. | General Biology and Genetics Fellowships Review Committee | 1967-70 |
| Laing, Dr. Calbert A. | Experimental Immunology Study Section | 1987- |
| Lamontagne, Dr. Nancy | Molecular and Cellular Biophysics Study Section | 1991- |
| Lamson, Mr. Glenn G., Jr. | Nursing Research Study Section | 1965-67 |
| Lamson, Mr. Glenn G., Jr. | Public Health Research Study Section | 1957-59 |
| Lamson, Mr. Glenn G., Jr. | Health Services Research Study Section | 1960-63 |
| Lamson, Mr. Glenn G., Jr. | Hospital Facilities Research Study Section | 1955-60 |
| Lamson, Mr. Glenn G., Jr. | Epidemiology and Disease Control Study Section | 1969-78 |
| Lane, Dr. John E. | Toxicology Study Section | 1963-66 |
| Lane, Dr. John E. | Environmental Sciences Review Committee | 1966-67 |
| Lang, Dr. Michael | Physiology Study Section | 1985- |
| Larsen, Dr. C. Donald | Physiological Chemistry Study Section | 1958-69 |
| Larsen, Dr. C. Donald | Biochemistry Study Section | 1956-58 |
| Lasky, Dr. Julian J. | Mental Health B Study Section | 1964-67 |
| Lavrin, Dr. David | Allergy and Immunology Study Section | 1978-79 |
| Lavrin, Dr. David | Experimental Immunology Study Section | 1979-87 |
| Leach, Dr. Berton J. | Cardiovascular and Pulmonary Study Section | 1974-76 |
| Leonard, Dr. Robert M. | Metabolism Study Section | 1965-86 |
| Leszczynski, Dr. Dennis | Reproductive Biology Study Section | 1993- |
| Levine, Dr. Harris | Surgery Study Section | 1956 |
| Levitin, Dr. Teresa | Human Development and Aging I Study Section | 1981- |
| Liacouras, Dr. Alexander S. | Medical Biochemistry Study Section | 1990- |
| Liacouras, Dr. Alexander S. | Biochemistry II Study Section | 1986-90 |
| Liacouras, Dr. Alexander S. | Clinical Sciences B Study Section | 1980-82 |
| Liacouras, Dr. Alexander S. | Biochemistry B Study Section | 1982-86 |
| Liang, Dr. Calbert A. | Experimental Immunology Study Section | 1987- |
| Liddell, Dr. Gerald | Microbial Physiology and Genetics 2 Study Section | 1982- |
| Lindsay, Dr. Dale R. | Dental Study Section | 1954-55 |
| Lipkin, Dr. Bernice S. | Clinical Sciences Study Section | 1982-88 |
| Lipkin, Dr. Bernice S. | Special Study Section | 1977-82 |
| Lipkin, Dr. Bernice S. | Computer and Biomathematical Sciences Study Section | 1972-77 |
| Litwack, Dr. Marsha | Experimental Therapeutics II Study Section | 1986- |
| Lum, Dr. Clark K. | Hematology Study Section | 1977-83 |
| Lum, Dr. Clark K. | Blood Research Study Section | 1980-81 |
| Lum, Dr. Clark K. | Hematology I Study Section | 1983- |
| Luoto, Dr. Lauri | Virology and Rickettsiology Study Section | 1961-66 |
| Luttermoser, Dr. George W. | Tropical Medicine and Parasitology Study Section | 1964-76 |
| Lyman, Dr. F. Earle | Morphology and Genetics Study Section | 1956 |
| MacNamee, Dr. James K. | Pathology B Study Section | 1964-75 |
| Maday, Dr. Bela C. | Behavioral Sciences B Fellowships Review Committee | 1966-67 |
| Manana, Dr. Andrew | Neurological Sciences I Study Section | 1990-93 |
| Marozzi, Dr. Alfred | Toxicology II Study Section | 1990- |
| Marozzi, Dr. Alfred | Toxicology Study Section | 1987-90 |
| Marozzi, Dr. Alfred | Toxicology I Study Section | 1990- |
| Marwah, Dr. Joseph | Neurology A Study Section | 1990- |
| Mathis, Dr. John | Pathobiochemistry Study Section | 1986-88 |
| Maurer, Dr. Bruce A. | Hematology II Study Section | 1983-86 |
| Maurer, Dr. Bruce A. | Virology Study Section | 1986-90, 1991-92 |
| Mayyasi, Dr. Sami | AIDS and Related Research Study Section 1 | 1988- |
| Mazarella, Dr. Nicholas M. | Biomedical Sciences B Study Section | 1979-81 |
| Mazarella, Dr. Nicholas M. | Biomedical Sciences A Study Section | 1979-81 |
| Mazarella, Dr. Nicholas M. | International Awards Study Section | 1982-84 |
| Mazarella, Dr. Nicholas M. | Clinical Sciences 3 Study Section | 1987-89 |
| Mazarella, Dr. Nicholas M. | Physiological Sciences Study Section | 1989- |
| McCardle, Dr. Peggy | Human Development and Aging II Study Section | 1992- |
| McCarthy, Dr. Thomas | Health Services Research Study Section | 1963-67 |
| McConnet, Dr. Jo Ann | Neurology B I Study Section | 1984-90 |
| McCutcheon, Dr. Rob | Toxicology Study Section | 1966-78 |

Appendix E (continued)

| Exec | Study Section Name | Term |
|------------------------------|------------------------------------------------------------|--------------|
| McDonald, Dr. Daniel | General Medicine B Study Section | 1986- |
| McFarland, Dr. Gertrude | Nursing Research Study Section | 1987- |
| McFarland, Dr. Willard L. | Neurology B I Study Section | 1983-84 |
| McFarland, Dr. Willard L. | Neurology B Study Section | 1973-83 |
| McGrath, Mr. Francis P. | Toxicology Study Section | 1959-63 |
| McGrath, Mr. Francis P. | Pharmacology and Experimental Therapeutics Study Section | 1957-64 |
| McGrath, Mr. Francis P. | Hematology Study Section | 1956 |
| McMillan, Dr. John J. | Experimental Psychology Study Section | 1957-58 |
| Meador, Mrs. Olive R. | Special Study Section | 1961-65 |
| Meador, Mrs. Olive R. | Accident Prevention Research Study Section | 1959-61 |
| Mehlman, Dr. Benjamin | Mental Health Fellowships Review Panel | 1961-63 |
| Meier, Dr. Gilbert | AIDS and Related Research Study Section 7 | 1992- |
| Meier, Dr. Gilbert | AIDS and Related Research Study Section 2 | 1988- |
| Meier, Dr. Gilbert | AIDS and Related Research Study Section 6 | 1990- |
| Meredith, Dr. O. M. | Special Study Section | 1976-78 |
| Merritt, Dr. Doris H. | General Medicine Study Section | 1958-60 |
| Merritt, Dr. Doris H. | Cardiovascular Study Section | 1958-61 |
| Meyer, Dr. John L. | Pathology A Study Section | 1984-88 |
| Milder, Dr. Jack W. | Surgery Study Section | 1957 |
| Minick, Dr. Leonard | Mental Health Fellowships Review Committee | 1966-67 |
| Morris, Dr. Rosemary S. | Cardiovascular and Renal Study Section | 1977-90 |
| Morris, Dr. William E. | Neurology A Study Section | 1964-82 |
| Moss, Dr. Samuel | Hematology Study Section | 1957-59 |
| Moss, Dr. Samuel | Human Embryology and Development Study Section | 1956-76 |
| Moss, Dr. W. G. | Cardiovascular Study Section | 1961-63 |
| Mourad, Dr. Nabeh | Special Study Section | 1988- |
| Mueller, Dr. Helmut | Hematology Study Section | 1969-71 |
| Munn, Dr. John | Pharmacology and Experimental Therapeutics Study Section | 1964-65 |
| Munn, Dr. John I. | Pharmacology and Endocrinology Fellowships Review | 1961-65 |
| Munn, Dr. John I. | Pharmacology and Experimental Therapeutics A Study Section | 1965-70 |
| Murray, Dr. A. Keith | Bio-Psychology Study Section | 1978- |
| Murray, Dr. A. Keith | Experimental Psychology B Study Section | 1965-67 |
| Murray, Dr. A. Keith | Experimental Psychology Study Section | 1967-78 |
| Myers, Dr. Betty J. | Special Study Section | 1985-89 |
| Myers, Dr. Betty J. | Tropical Medicine and Parasitology Study Section | 1976-85 |
| Nadel, Dr. Eli | General Medicine Study Section | 1957 |
| Nadel, Dr. Eli | Pathology Study Section | 1956-58 |
| Nayak, Dr. Ramesh K. | Molecular Cytology Study Section | 1978- |
| Neff, Dr. Miriam L. | Neurology Program-Project Committee | 1961-62 |
| Neff, Dr. Miriam L. | Mental Health Program-Project Committee | 1961-62 |
| Newrock, Dr. Kenneth | Neurology C Study Section | 1985- |
| Novello, Dr. Antonia | General Medicine B Study Section | 1981-86 |
| O'Brian, Dr. Thomas E. | Virus and Rickettsial Study Section | 1952-53 |
| O'Brien, Dr. Thomas E. | Sensory Diseases Study Section | 1954-62 |
| O'Brien, Dr. Thomas E. | Neurology B Study Section | 1963-70 |
| O'Brien, Dr. Thomas E. | Neurology Study Section | 1954-61 |
| Offutt, Dr. Edward P. | Hematology Study Section | 1955-56 |
| Offutt, Dr. Edward P. | Microbiology and Immunology Study Section | 1951-54 |
| Offutt, Dr. Edward P. | Pathology Study Section | 1955 |
| Offutt, Dr. Edward P. | Dental Study Section | 1951-53 |
| Offutt, Dr. Edward P. | Virus and Rickettsial Study Section | 1951-52 |
| Omata, Dr. Robert R. | Biochemistry and Nutrition Fellowships Review Panel | 1961-65 |
| Omata, Dr. Robert R. | Biochemistry and Nutrition Fellowships Review Panel | 1961-65 |
| Osborne, Dr. Scott | Epidemiology and Disease Control I Study Section | 1990- |
| Padarathsingh, Dr. Martin L. | Pathology B Study Section | 1981-86, 89- |
| Panniers, Dr. Richard | Special Study Section | 1991- |
| Parakkal, Dr. Paul F. | Surgery and Bioengineering Study Section | 1983- |
| Parent, Miss Katharine A. | Primate Research Study Section | 1955-63 |
| Peabody, Dr. Richard, Sr. | Experimental Cardiovascular Sciences Study Section | 1980-94 |
| Pearl, Dr. David | Mental Health A Study Section | 1963-67 |

Appendix E (continued)

| Exec | Study Section Name | Term |
|-----------------------------|-------------------------------------------------------------------|---------|
| Pearson, Dr. Nancy J. | Biological Sciences 3 Study Section | 1993- |
| Pelham, Dr. Josephine | Clinical Sciences I Study Section | 1990- |
| Pelham, Dr. Josephine | Clinical Sciences 4 Study Section | 1988-90 |
| Pelham, Dr. Josephine | Clinical Sciences 2 Study Section | 1988- |
| Perkins, Dr. Philip | Experimental Therapeutics I Study Section | 1989- |
| Petrucelli, Dr. Lawrence M. | Pharmacology and Experimental Therapeutics A Study Section | 1971-74 |
| Pinkus, Dr. Larry | Oral Biology and Medicine I Study Section | 1992-95 |
| Pinkus, Dr. Larry | Pathology A Study Section | 1995- |
| Pons, Dr. Marcel | AIDS and Related Research Study Section 3 | 1988- |
| Pons, Dr. Marcel | AIDS and Related Research Study Section 7 | 1990-92 |
| Poonian, Dr. Mohindar | AIDS and Related Research Study Section 4 | 1988- |
| Poonian, Dr. Mohindar | AIDS and Related Research Study Section 5 | 1990- |
| Poslow, Dr. Elliott | Special Study Section | 1988-89 |
| Powell, Dr. Clinton C. | Radiation Study Section | 1958 |
| Powell, Dr. Clinton C. | Surgery Study Section | 1958 |
| Powers, Dr. Kendall | AIDS and Related Research Study Section 5 | 1988-90 |
| Powers, Dr. Marcelina | Metabolic Pathology Study Section | 1986- |
| Pral, Dr. James | Special Study Section | 1966-67 |
| Preusch, Dr. Peter | Special Study Section | 1990-92 |
| Pronove, Dr. Pacita | Neurology Study Section | 1961-62 |
| Pronove, Dr. Pacita | Neurology A Study Section | 1962-64 |
| Pronove, Dr. Pacita | Child Health and Human Development Program-Project Committee | 1965 |
| Pronove, Dr. Pacita | General Medicine B Study Section | 1965-72 |
| Pubols, Dr. Lilian | Neurology B I Study Section | 1992- |
| Quatrano, Dr. Louis | Behavioral and Neurosciences Study Section | 1983-84 |
| Quatrano, Dr. Louis | Human Development and Aging II Study Section | 1988-92 |
| Quatrano, Dr. Louis | Special Study Section | 1984-88 |
| Radtke, Dr. Harold, Jr. | Bio-Organic and Natural Products Chemistry Study Section | 1989- |
| Radtke, Dr. Harold, Jr. | Special Study Section | 1988-89 |
| Raizen, Dr. C. Eileen | Special Study Section | 1981-88 |
| Raizen, Dr. C. Eileen | Microbial Chemistry Study Section | 1977-80 |
| Raizen, Dr. C. Eileen | Microbial Genetics Study Section | 1979-82 |
| Rakhit, Dr. Gopa | Physical Biochemistry Study Section | 1985- |
| Rakhit, Dr. Gopa | Special Study Section | 1984-85 |
| Rawlings, Dr. Samuel C. | Social Sciences and Population Study Section | 1990-92 |
| Rawlings, Dr. Samuel C. | Behavioral Sciences Study Section | 1980-81 |
| Rawlings, Dr. Samuel C. | Human Development and Aging II Study Section | 1981-86 |
| Reed, Mr. R. Donald | Biophysics and Biophysical Chemistry Fellowships Review Panel | 1962-65 |
| Reed, Mr. R. Donald | Organic and Medicinal Chemistry Fellowship Review Committee | 1962-63 |
| Reed, Mr. R. Donald | Dental Study Section | 1955-56 |
| Reed, Mr. R. Donald | Biophysical and Organic Chemistry Fellowships Review Panel | 1961-62 |
| Reed, Mr. R. Donald | Biophysics and Biophysical Chemistry Fellowships Review Committee | 1965-69 |
| Reed, Mr. R. Donald | Biomedical Engineering Fellowships Review Committee | 1966-69 |
| Reid, Dr. Otto M. | Behavioral Sciences Fellowships Review Panel | 1961-65 |
| Reid, Dr. Otto M. | Behavioral Sciences A Fellowship Review Committee | 1965-66 |
| Reinhard, Dr. Karl R. | General Medicine Study Section | 1960-63 |
| Reitman, Dr. Morton | Allergy and Immunology Study Section | 1977-82 |
| Reitman, Dr. Morton | Special Study Section | 1973-77 |
| Remondini, Dr. David J. | Genetics Study Section | 1977- |
| Rittenhouse, Dr. Joan D. | Behavioral Medicine Study Section | 1980-90 |
| Roahng, Mr. Henry L. | Sanitation Study Section | 1948-49 |
| Roberts, Dr. Harry F. | Bacteriology and Mycology B Study Section | 1964-66 |
| Roberts, Dr. Jerry H. | Special Study Section | 1979-83 |
| Roberts, Dr. Jerry H. | Mammalian Genetics Study Section | 1982- |
| Rogers, Dr. Michael E. | Bio-Organic and Natural Products Chemistry Study Section | 1980-89 |
| Rosen, Dr. Lee | Special Study Section | 1989- |
| Rovick, Dr. Allen A. | Cardiovascular A Study Section | 1970-71 |
| Sansione, Dr. William R. | Biochemistry Study Section | 1973-74 |
| Saunders, Dr. J. Palmer | Cancer Chemotherapy Study Section | 1957-58 |
| Saunders, Dr. J. Palmer | Pharmacology and Experimental Therapeutics Study Section | 1956 |

Appendix E (continued)

| Exec | Study Section Name | Term |
|----------------------------|----------------------------------------------------------------|---------|
| Saunders, Dr. J. Palmer | Metabolism Study Section | 1959 |
| Savchuck, Dr. William | Pathology A Study Section | 1965-77 |
| Scantlebury, Dr. R. E. | Sensory Diseases Study Section | 1951 |
| Scantlebury, Dr. R. E. | Physiology Study Section | 1950-51 |
| Schiaffino, Dr. S. Stephen | Hematology Study Section | 1964-65 |
| Schluenderberg, Dr. Ann | Epidemiology and Disease Control Study Section | 1979-81 |
| Schluenderberg, Dr. Ann | Epidemiology and Disease Control B Study Section | 1981-87 |
| Schmehl, Dr. Francis L. | Committee on Sectional Research in Microbiology | 1951-54 |
| Schmehl, Dr. Francis L. | Tropical Diseases Study Section | 1949 |
| Schmehl, Dr. Francis L. | Morphology and Genetics Study Section | 1952-53 |
| Schmehl, Dr. Francis L. | Committee on Radiation Studies | 1953 |
| Schmehl, Dr. Francis L. | Malaria Study Section | 1948-49 |
| Schmehl, Dr. Francis L. | Experimental Therapeutics Study Section | 1949-50 |
| Schmehl, Dr. Francis L. | Syphilis Study Section | 1949 |
| Schneider, Dr. Donald | Special Study Section | 1990- |
| Schubert, Dr. John R. | Nutrition Study Section | 1963-86 |
| Schwartz, Dr. Samuel M. | Medicinal Chemistry A Study Section | 1964-69 |
| Scott, Dr. J. Alan | Allergy and Infectious Diseases Program-Project Committee | 1962-63 |
| Scudder, Dr. Harvey I. | Virology and Rickettsiology Study Section | 1958-59 |
| Scudder, Dr. Harvey I. | Microbiology Study Section | 1967-58 |
| Seger, Dr. Gordon H. | Public Health Study Section | 1951 |
| Seger, Dr. Gordon H. | Neurology Field Investigations Study Section | 1957-59 |
| Seger, Dr. Gordon H. | General Clinical Research Center Committee | 1961-62 |
| Seger, Dr. Gordon H. | Antibiotics Study Section | 1947-48 |
| Seger, Dr. Gordon H. | Syphilis Study Section | 1947-49 |
| Seger, Dr. Gordon H. | Tuberculosis Study Section | 1948 |
| Sellin, Dr. Lawrence | Neurology B I Study Section | 1991- |
| Seto, Dr. Belinda | Virology Study Section | 1990-91 |
| Shaikh, Dr. Abubakar | Reproductive Endocrinology Study Section | 1988- |
| Silber, Dr. Gustave | Microbial Chemistry Study Section | 1967-77 |
| Silber, Dr. Gustave | Bacteriology and Mycology B Study Section | 1966-67 |
| Simos, Dr. Irving | Psychopharmacology Study Section | 1959-67 |
| Sinnett, Dr. Everett | Respiratory and Applied Physiology Study Section | 1990- |
| Slater, Dr. Martin L. | Microbial Physiology Study Section | 1980-82 |
| Slater, Dr. Martin L. | Microbial Physiology and Genetics A Study Section | 1982- |
| Smith, Dr. Claudia S. P. | Cancer Chemotherapy Study Section | 1960-63 |
| Smith, Dr. Eleanor | Special Study Section | 1982-85 |
| Smith, Dr. Falconer | Radiation Study Section | 1961-64 |
| Solomon, Dr. Joel | Hematology II Study Section | 1986-88 |
| Sooter, Dr. Clarence A. | General Medical Research Program-Project Committee | 1961-62 |
| Sostek, Dr. Anita M. | Neurological Sciences I Study Section | 1993-94 |
| Sostek, Dr. Anita M. | Human Development and Aging III Study Section | 1988-93 |
| Speelman, Dr. Clair R. | Heart Program-Project Committee | 1961-62 |
| Speelman, Dr. Clair R. | Special Study Section | 1966-73 |
| Sri Ram, Dr. Jandhyala | Pathological Chemistry Study Section | 1975-77 |
| Sri Ram, Dr. Jandhyala | Special Study Section | 1974-75 |
| Stamper, Dr. Hugh | Special Study Section | 1983-85 |
| Stamper, Dr. Hugh | Immunological Sciences Study Section | 1985-87 |
| Stengle, Dr. James M. | Neurology Field Investigations Study Section | 1959-61 |
| Stengle, Dr. James M. | Hematology Study Section | 1959-61 |
| Stevenson, Dr. Heber J. R. | Special Study Section | 1970-75 |
| Stevenson, Dr. Heber J. R. | Biomedical Engineering Fellowships Review Committee | 1967-70 |
| Stevenson, Dr. Heber J. R. | Medicinal and Organic Chemistry A Fellowships Review Committee | 1969-70 |
| Stevenson, Dr. Heber J. R. | Environmental Sciences and Engineering B Study Section | 1965-67 |
| Stewart, Mrs. Ileen E. | Applied Physiology and Bioengineering Study Section | 1972-76 |
| Stewart, Mrs. Ileen E. | Applied Physiology Study Section | 1970-72 |
| Stewart, Mrs. Ileen E. | Biomedical Communications Study Section | 1967-76 |
| Stewart, Mrs. Ileen E. | Applied Physiology and Orthopedics Study Section | 1976-81 |
| Stewart, Mrs. Ileen E. | Orthopedics and Musculoskeletal Study Section | 1981-95 |
| Stewart, Mrs. Ileen E. | History of the Life Sciences Study Section | 1967-73 |

Appendix E (continued)

| Exec | Study Section Name | Term |
|-----------------------------|--------------------------------------------------------------|---------|
| Stiles, Dr. Horace | Epidemiology and Disease Control II Study Section | 1987- |
| Stone, Dr. F. L. | Committee on Radiation Studies | 1951-52 |
| Stonehill, Dr. Elliott | Mammalian Genetics Study Section | 1981-82 |
| Stoolmiller, Dr. Allen | Neurological Sciences Study Section | 1984-85 |
| Stoolmiller, Dr. Allen | Special Study Section | 1979-84 |
| Stoolmiller, Dr. Allen | Neurological Sciences I Study Section | 1985-90 |
| Straat, Dr. Patricia A. | Molecular and Cellular Biophysics Study Section | 1982-87 |
| Straube, Dr. Robert | Radiation Study Section | 1964-84 |
| Streufert, Dr. Susan | Human Development and Aging III Study Section | 1984-87 |
| Streufert, Dr. Susan C. | Epidemiology and Disease Control Study Section | 1978-79 |
| Streufert, Dr. Susan C. | Behavioral Medicine Study Section | 1979-80 |
| Strudler, Dr. Paul K. | Radiation Study Section | 1990- |
| Strudler, Dr. Paul K. | Special Study Section | 1988-89 |
| Stylos, Dr. William | Immunobiology Study Section | 1980-92 |
| Su, Dr. Robert | Molecular Biology Study Section | 1990- |
| Suran, Dr. Anita | Visual Sciences A I Study Section | 1989-93 |
| Syme, Dr. S. Leonard | Public Health Research Study Section | 1960 |
| Syme, Dr. S. Leonard | Human Ecology Study Section | 1960-62 |
| Tarpley, Dr. Thomas M., Jr. | Oral Biology and Medicine Study Section | 1975-84 |
| Tarpley, Dr. Thomas M., Jr. | Dental Study Section | 1974-75 |
| Tarpley, Dr. Thomas M., Jr. | Oral Biology and Medicine II Study Section | 1984-85 |
| Tarpley, Dr. Thomas M., Jr. | Oral Biology and Medicine I Study Section | 1984-85 |
| Teitelbaum, Dr. Herman | Neurobiology Study Section | 1982-83 |
| Teitelbaum, Dr. Herman | Neurology B II Study Section | 1983- |
| Thompson, Dr. Louise G. | Neurology B Study Section | 1970-73 |
| Thompson, Dr. Louise G. | Special Study Section | 1969-70 |
| Thompson, Dr. Louise G. | Child Health and Human Development Program-Project Committee | 1965-70 |
| Thurman, Dr. Ernestine B. | Tropical Medicine and Parasitology Study Section | 1958-64 |
| Tibbitts, Mrs. Helen G. | Behavioral Sciences A Fellowship Review Committee | 1966-70 |
| Tibbitts, Mrs. Helen G. | Nursing Research Study Section | 1957-65 |
| Tibbitts, Mrs. Helen G. | Biostatistics Fellowships Review Committee | 1966 |
| Tibbitts, Mrs. Helen G. | Behavioral Sciences A Fellowships Review Committee | 1966-70 |
| Toliver, Dr. Adolphus P. | Biochemistry I Study Section | 1986-90 |
| Toliver, Dr. Adolphus P. | Biochemistry Study Section | 1990-94 |
| Toliver, Dr. Adolphus P. | Biochemistry A Study Section | 1981-86 |
| Toliver, Dr. Adolphus P. | Biochemistry Study Section | 1975-81 |
| Turner, Dr. James H. | Immunobiology Study Section | 1967-80 |
| Turner, Dr. James H. | Allergy and Immunology B Study Section | 1964-67 |
| Underwood, Dr. Bruce | Cell Biology Fellowships Review Panel | 1961-65 |
| Uram, Dr. Jerome | Nutrition Study Section | 1959-61 |
| Valle, Dr. A Roberto | Hematology Study Section | 1967-68 |
| Vander, Dr. John B. | Metabolism and Endocrinology Study Section | 1947-48 |
| Varga, Dr. Janos M. | Biochemical Endocrinology Study Section | 1987-88 |
| Vydelingum, Dr. Nada | Special Study Section | 1991- |
| Warren, Dr. Galen B. | International and Cooperative Projects Study Section | 1989- |
| Warren, Dr. Katherine B. | Cell Biology A Study Section | 1966-69 |
| Warren, Dr. Katherine B. | Cell Biology Study Section | 1961-66 |
| Warren, Dr. Katherine B. | Special Study Section | 1969-71 |
| Waters, Dr. Harold A. | Pathology A Study Section | 1978-81 |
| Watkins, Dr. Clyde A. | Respiratory and Applied Physiology Study Section | 1987-90 |
| Watzman, Dr. Nathan | Respiratory and Applied Physiology Study Section | 1982-84 |
| Waxman, Dr. Bruce D. | Advisory Committee on Computers in Research | 1961-65 |
| Weinblatt, Dr. Anita C. | Respiratory and Applied Physiology Study Section | 1986-87 |
| Weinblatt, Dr. Anita C. | Immunological Sciences Study Section | 1987- |
| Weinstein, Dr. Constance E. | Cardiovascular and Pulmonary Study Section | 1979-82 |
| Weinstein, Dr. Laura | Behavioral and Neurosciences Study Section | 1981-83 |
| Weiss, Dr. Ulrich | Dental Study Section | 1957 |
| Weiler, Dr. Robert | Social Sciences and Population Study Section | 1992- |
| Wilcox, Dr. Jane | Disease Control Study Section | 1964-65 |
| Wilcox, Dr. Jane | Epidemiology and Disease Control Study Section | 1965-69 |

Appendix E (concluded)

| Exec | Study Section Name | Term |
|----------------------------|------------------------------------------------------------|---------|
| Wilcox, Dr. Jane | Applied Physiology Study Section | 1964-66 |
| Willy, Dr. Richard R. | Mental Health Study Section | 1955-57 |
| Wilson, Dr. Katherine S. | Genetics Study Section | 1958-77 |
| Wilson, Dr. W. Elbert, Jr. | Biomedical Sciences 1 Study Section | 1985 |
| Wilson, Dr. W. Elbert, Jr. | Clinical Sciences Study Section | 1984-85 |
| Wilson, Dr. W. Elbert, Jr. | Biomedical Sciences 5 Study Section | 1984-88 |
| Winestock, Dr. Claire H. | Virology Study Section | 1969-86 |
| Wingate, Dr. Catherine | Diagnostic Radiology and Nuclear Medicine Study Section | 1979- |
| Wingate, Dr. Catherine | Radiation Study Section | 1978-79 |
| Wolff, Dr. John B. | Biophysics and Biophysical Chemistry B Study Section | 1966-81 |
| Wolff, Dr. John B. | Biophysical Chemistry Study Section | 1981-90 |
| Woodbury, Dr. Catherine | Special Study Section | 1981-82 |
| Woodbury, Dr. Catherine | Neurology A Study Section | 1982-90 |
| Woods, Dr. Irving A. | Behavioral Sciences Study Section | 1962-66 |
| Woolf, Dr. Bertie H. R. | Pharmacology and Experimental Therapeutics A Study Section | 1970-71 |
| Woolf, Dr. Bertie H. R. | Developmental Behavioral Sciences Study Section | 1967-78 |
| Woolf, Dr. Bertie H. R. | Behavioral and Neurosciences Study Section | 1981-85 |
| Woolf, Dr. Bertie H. R. | Behavioral and Neurosciences B Study Section | 1979-81 |
| Woolf, Dr. Bertie H. R. | Human Development Study Section | 1978-79 |
| Woolf, Dr. Bertie H. R. | Developmental Behavioral Sciences Study Section | 1967-78 |
| Woolf, Dr. Bertie H. R. | Human Ecology Study Section | 1962-64 |
| Woolf, Dr. Bertie H. R. | Biomedical Communications Study Section | 1966-67 |
| Woolf, Dr. Bertie H. R. | Accident Prevention Research Study Section | 1964-67 |
| Woolf, Dr. Bertie H. R. | Behavioral and Neurosciences A Study Section | 1979-81 |
| Wortman, Dr. Bernard | Neurology B Study Section | 1969-70 |
| Wu, Dr. Ai-Lien | Nutrition Study Section | 1986-91 |
| Yeager, Dr. J. Franklin | Hematology Study Section | 1949 |
| Yeager, Dr. J. Franklin | Physiology Study Section | 1949 |
| Yeager, Dr. J. Franklin | Radiobiology Study Section | 1949 |
| Yellin, Dr. Herbert | Respiratory and Applied Physiology Study Section | 1984-86 |
| Young, Dr. Marguerite L. | Psychological Sciences Fellowships Review Panel | 1961-63 |
| Zapolski, Dr. Edward | Metallobiochemistry Study Section | 1987- |
| Zebovitz, Dr. Eugene | Experimental Virology Study Section | 1975-83 |
| Zebovitz, Dr. Eugene | Special Study Section | 1974-75 |
| Zebovitz, Dr. Eugene | Biochemistry Study Section | 1974-75 |
| Zimbrick, Dr. John B. | Radiation Study Section | 1984-89 |
| Zimmerman, Dr. Eugene | Allergy and Immunology Study Section | 1982-89 |

Appendix F

DRG Study Section Chairmen, 1946 – 1995

Listings are from *Members of Advisory Groups of the National Institutes of Health, 1946 – 1961*; *Members of Advisory Groups of the National Institutes of Health, 1961 – January 1, 1967*; *NIH Advisory Committees and Electronic Roster* for 1994 through June 1995. Listings of subcommittees for 1994 through June 1995 are from the *Electronic Roster*. Institute review groups are excluded.

Appendix F

| Chair | Study Section Name | Term |
|-----------------------------|------------------------------------------------------------|---------|
| Abbas, Dr. Abul K. | Pathology A Study Section | 1986-88 |
| Abraham, Dr. George N. | Experimental Immunology Study Section | 1983-85 |
| Abrams, Dr. Richard | Molecular Biology Study Section | 1970-71 |
| Abress, Dr. Christine K. | Pathology A Study Section | 1994-96 |
| Adler, Dr. Frank L. | Immunological Sciences Study Section | 1976-77 |
| Adler, Dr. Ruben | Neurology B Study Section | 1989-91 |
| Ahrens, Dr. Edward H., Jr. | Metabolism Study Section | 1960-61 |
| Aisen, Dr. Philip | Metallobiochemistry Study Section | 1982-83 |
| Al-Askari, Dr. Salah | Immunobiology Study Section | 1975-77 |
| Albert, Dr. Alexander | Endocrinology Study Section | 1960-63 |
| Alberts, Dr. Bruce M. | Molecular Cytology Study Section | 1984-86 |
| Alexander, Dr. J. Wesley | Surgery, Anesthesiology and Trauma Study Section | 1990-93 |
| Alexander, Dr. R. Wayne | Pharmacology Study Section | 1985-87 |
| Allen, Dr. Willard M. | Human Embryology and Development Study Section | 1957-60 |
| Allison, Dr. James P. | Experimental Immunology Study Section | 1987-90 |
| Almond, Dr. Peter R. | Radiation Study Section | 1988-90 |
| Altmeier, Dr. William A. | Surgery B Study Section | 1972-74 |
| Amos, Dr. Bernard | Immunology Study Section | 1970-73 |
| Anderson, Dr. Douglas R. | Visual Sciences A Study Section | 1975-76 |
| Anderson, Dr. Everett | Reproductive Biology Study Section | 1983-85 |
| Anderson, Dr. Marjorie E. | Neurology B Study Section | 1991-93 |
| Anderson, Dr. Paul S. | Bio-Organic and Natural Products Chemistry Study Section | 1988-89 |
| Anderson, Dr. Richard G. W. | Molecular Cytology Study Section | 1983-84 |
| Anderson, Dr. Robert H. | Surgery and Bioengineering Study Section | 1994-96 |
| Anderson, Dr. V. Elving | Developmental Behavioral Sciences Study Section | 1974-75 |
| Andrus, Dr. E. Cowles | Cardiovascular Study Section | 1946-51 |
| Andrus, Dr. E. Cowles | Primate Research Study Section | 1955-57 |
| Anglevine, Dr. Jay B., Jr. | Neurology B Study Section | 1974-76 |
| Apicella, Dr. Michael A. | Bacteriology and Mycology Study Section | 1986-88 |
| Appel, Dr. Stanley H. | Neurology A Study Section | 1979-83 |
| Appleton, Dr. J. L. T. | Dental Study Section | 1951-53 |
| Archer, Dr. Gordon L. | Bacteriology and Mycology Study Section | 1989-91 |
| Archer, Dr. Philip G. | Epidemiology and Disease Control Study Section | 1979-81 |
| Archer, Dr. Sidney | Medicinal Chemistry A Study Section | 1976-78 |
| Armaly, Dr. Mansour F. | Visual Sciences Study Section | 1967-68 |
| Armstrong, Dr. Clay M. | Physiology Study Section | 1978-79 |
| Armstrong, Dr. Richard N. | Biochemistry Study Section | 1991-93 |
| Arnsperger, Dr. Barry G. W. | Neurology C Study Section | 1985-87 |
| Ashman, Dr. Robert F. | Allergy and Immunology Study Section | 1983-85 |
| Atkinson, Dr. John P. | General Medicine A Study Section | 1985-86 |
| Atkinson, Dr. Richard I. | Nutrition Study Section | 1993-95 |
| Augenlicht, Dr. Leonard H. | Metabolic Pathology Study Section | 1991-93 |
| Avioli, Dr. Louis V. | General Medicine B Study Section | 1975-77 |
| Avioli, Dr. Louis V. | Arthritis and Metabolic Diseases Program-Project Committee | 1970-71 |
| Avner, Dr. Ellis D. | General Medicine Study Section | 1994 |
| Bache, Dr. Robert J. | Cardiovascular and Pulmonary Study Section | 1984-86 |
| Bachenheimer, Dr. Steven L. | Clinical Sciences Study Section | 1987-88 |
| Bagshaw, Dr. Malcolm A. | Radiation Study Section | 1971-72 |
| Bahnson, Dr. Henry T. | Surgery A Study Section | 1972-74 |
| Bailey, Dr. Bryon J. | Communicative Sciences Study Section | 1977-79 |
| Baker, Dr. Bernard R. | Medicinal Chemistry A Study Section | 1968-70 |
| Balach, Dr. Alan L. | Metallobiochemistry Study Section | 1992-94 |
| Baldwin, Dr. Alfred L. | Mental Health B Study Section | 1962-64 |
| Baldwin, Dr. Alfred L. | Mental Health Study Section | 1961-62 |
| Barach, Dr. Joseph H. | Metabolism and Endocrinology Study Section | 1946-51 |
| Barbieri, Dr. Robert L. | Reproductive Biology Study Section | 1993-95 |
| Barnes, Dr. Robert L. | Bacteriology and Mycology Study Section | 1991-93 |
| Barnes, Dr. Robert L. | Endocrinology Study Section | 1977-79 |
| Barker, Dr. Kenneth L. | Reproductive Biology Study Section | 1985-87 |
| Barnes, Dr. Allen C. | Human Embryology and Development Study Section | 1960-63 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|-----------------------------|------------------------------------------------------------|---------|
| Barraclough, Dr. Charles A. | Reproductive Biology Study Section | 1973-74 |
| Barron, Dr. Donald H. | Human Embryology and Development Study Section | 1963-67 |
| Bartke, Dr. Andrej | Reproductive Biology Study Section | 1987-89 |
| Barton, Dr. Jacqueline K. | Metallobiochemistry Study Section | 1988-90 |
| Baserga, Dr. Renato | Pathology B Study Section | 1971-73 |
| Baue, Dr. Arthur E. | Surgery and Bioengineering Study Section | 1980-82 |
| Bauer, Dr. Eugene A. | General Medicine A I Study Section | 1994-96 |
| Baylor, Dr. Denis A. | Visual Sciences A Study Section | 1986-88 |
| Beal, Dr. John M. | Surgery B Study Section | 1976-78 |
| Bean, Dr. Lee L. | Social Sciences and Population Study Section | 1982-85 |
| Bean, Dr. William B. | General Medicine Study Section | 1959-61 |
| Beattie, Dr. Diana S. | Physical Biochemistry Study Section | 1983-85 |
| Becker, Dr. Dorothy J. | Metabolism Study Section | 1994-96 |
| Becker, Dr. Robert R. | Biomedical Sciences Study Section | 1982-83 |
| Bedford, Dr. Joel S. | Radiation Study Section | 1987-88 |
| Beer, Dr. Alan E. | Human Embryology and Development Study Section | 1988-89 |
| Behrems, Dr. Rolf G. | Oral Biology and Medicine Study Section | 1988-90 |
| Beinert, Dr. Helmut | Biophysics and Biophysical Chemistry Study Section | 1976-78 |
| Belding, Dr. Harwood S. | Applied Physiology and Bioengineering Study Section | 1973 |
| Belfort, Dr. Marlene | Microbial Physiology and Genetics Study Section | 1990-92 |
| Beller, Dr. George A. | Cardiovascular and Pulmonary Study Section | 1989-91 |
| Belli, Dr. James A. | Radiation Study Section | 1979-80 |
| Belzer, Dr. Folkert O. | Surgery, Anesthesiology and Trauma Study Section | 1984-86 |
| Ben-Jonathan, Dr. Nira | Endocrinology Study Section | 1987-88 |
| Benet, Dr. Leslie Z. | Pharmacology Study Section | 1979-81 |
| Bengston, Dr. Vern L. | Human Development and Aging Study Section | 1986-87 |
| Benison, Dr. Saul | History of the Life Sciences Study Section | 1971-72 |
| Benjamin, Dr. John D. | Mental Health Study Section | 1954-55 |
| Bennett, Dr. J. Claude | Allergy and Immunology Study Section | 1975-78 |
| Benton, Dr. Arthur L. | Mental Health A Study Section | 1964-66 |
| Benz, Dr. Edward J., Jr. | Hematology I Study Section | 1993-95 |
| Berlin, Dr. Richard | Cell Biology Study Section | 1979-80 |
| Berry, Dr. L. Joe | Bacteriology and Mycology A Study Section | 1966-67 |
| Berenthal, Dr. Bennett I. | Human Development and Aging I Study Section | 1994-96 |
| Bertino, Dr. Joseph R. | Pharmacology B Study Section | 1968-69 |
| Bertles, Dr. John F. | Hematology Study Section | 1983-85 |
| Betz, Dr. William J. | Neurology B Study Section | 1988-89 |
| Bier, Dr. Dennis M. | Nutrition Study Section | 1981-83 |
| Birt, Dr. Diane F. | Metabolic Pathology Study Section | 1990-91 |
| Bishop, Dr. J. Michael | Virology Study Section | 1980-82 |
| Bissonette, Dr. John | Human Embryology and Development Study Section | 1989-91 |
| Blackard, Dr. William G. | Metabolism Study Section | 1985-88 |
| Blakley, Dr. Raymond L. | Experimental Therapeutics Study Section | 1978-79 |
| Blanton, Dr. Patricia | Oral Biology and Medicine Study Section | 1985-88 |
| Blazer, Dr. Dan G. | Epidemiology and Disease Control Study Section | 1988-89 |
| Blocker, Dr. T. G., Jr. | Surgery Study Section | 1959-64 |
| Blood, Dr. Frank R. | Toxicology Study Section | 1964-67 |
| Blout, Dr. Elkan R. | Biophysics and Biophysical Chemistry A Study Section | 1966-68 |
| Boeckman, Dr. Robert K. | Medicinal Chemistry Study Section | 1983-84 |
| Boekelheide, Dr. Kim | Toxicology II Study Section | 1993-95 |
| Boekelheide, Dr. Virgil C. | Medical Chemistry A Study Section | 1964-66 |
| Bohne, Dr. Barbara A. | Communicative Sciences Study Section | 1981-83 |
| Boies, Dr. Lawrence R. | Communicative Sciences Study Section | 1966-67 |
| Bok, Dr. Dean | Visual Sciences A Study Section | 1985-86 |
| Bollet, Dr. Alfred J. | General Medicine A Study Section | 1965-66 |
| Bond, Dr. James A. | Toxicology I Study Section | 1993-95 |
| Bond, Dr. Judith S. | Biochemistry Study Section | 1989-91 |
| Bond, Dr. Victor P. | Radiation Study Section | 1967-68 |
| Bondy, Dr. Philip K. | Arthritis and Metabolic Diseases Program-Project Committee | 1966-68 |
| Bondy, Dr. Stephen C. | Neurology A Study Section | 1993-95 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|-----------------------------|--------------------------------------------------|---------|
| Bornstein, Dr. Paul | Pathobiological Chemistry Study Section | 1981-82 |
| Bothwell, Dr. Mark A. | Biological Sciences Study Section | 1989-91 |
| Bowden, Dr. George T. | Chemical Pathology Study Section | 1986-88 |
| Boyer, Dr. Paul D. | Biochemistry Study Section | 1963-67 |
| Boyton, Dr. Robert M. | Visual Sciences Sciences B Study Section | 1974-77 |
| Braceland, Dr. Francis J. | History of Life Sciences Study Section | 1968-70 |
| Bradley, Dr. Robert M. | Sensory Disorders and Language Study Section | 1988-89 |
| Bradshaw, Dr. Ralph A. | Physiological Chemistry Study Section | 1978-79 |
| Braude, Dr. Abraham I. | Bacteriology and Mycology Study Section | 1969-70 |
| Bricker, Dr. Neal S. | General Medicine A Study Section | 1966-68 |
| Briggs, Dr. F. Norman | Cardiovascular and Pulmonary Study Section | 1978-80 |
| Briggs, Dr. Josephine P. | General Medicine B Study Section | 1994-96 |
| Brinkhous, Dr. Kenneth M. | Pathology Study Section | 1958 |
| Brinkhous, Dr. Kenneth M. | Hematology Study Section | 1959-62 |
| Brobeck, Dr. John R. | Physiology Study Section | 1961-63 |
| Brodman, Dr. Estelle | Biomedical Communications Study Section | 1973-75 |
| Broom, Dr. Arthur D. | AIDS and Related Research Study Section 4 | 1992-95 |
| Brown, Dr. Arthur M. | Physiology Study Section | 1974-76 |
| Brown, Dr. J. Martin | Radiation Study Section | 1994-96 |
| Brown, Dr. Roger W. | Behavioral Sciences Study Section | 1961-63 |
| Brown, Dr. Truman R. | Diagnostic Radiology Study Section | 1993-95 |
| Brown, Dr. Virgil W. | Metabolism Study Section | 1980-81 |
| Bruner, Dr. Dorsey W. | Bacteriology and Mycology A Study Section | 1964-66 |
| Brunson, Dr. Joel G. | Pathology A Study Section | 1965-67 |
| Bryant, Dr. Robert G. | Biophysical Chemistry Study Section | 1983-86 |
| Buchanan, Dr. Douglas N. | Neurology A Study Section | 1967-71 |
| Buchanan, Dr. John M. | Biochemistry Study Section | 1961-63 |
| Buck, Dr. Carl | Public Health Study Section | 1950-53 |
| Buck, Dr. Clayton | Pathobiochemistry Study Section | 1990-92 |
| Buckley, Dr. Rebecca H. | Immunological Sciences Study Section | 1979-80 |
| Buckwald, Dr. Jennifer S. | Bio-Psychology Study Section | 1990-91 |
| Budinger, Dr. Thomas F. | Diagnostic Radiology Study Section | 1982-85 |
| Buja, Dr. L. Maximilian | Cardiovascular and Pulmonary Study Section | 1987-89 |
| Bulkey, Dr. Gregory B. | General Medicine A Study Section | 1990-91 |
| Bumpass, Dr. Larry L. | Social Sciences and Population Study Section | 1978-80 |
| Burch, Dr. George E. | Cardiovascular Study Section | 1952-53 |
| Burdette, Dr. W. J. | Genetics Study Section | 1958-61 |
| Burgess, Dr. Ann W. | AIDS and Related Research Study Section 6 | 1992-94 |
| Burgess, Dr. Barbara K. | Metalloprotein Chemistry Study Section | 1994-96 |
| Burton, Dr. Harold | Neurological Sciences Study Section | 1990-92 |
| Buskirk, Dr. Elsworth R. | Applied Physiology Study Section | 1967-68 |
| Buskirk, Dr. Elsworth R. | Applied Physiology and Orthopedics Study Section | 1978-80 |
| Butcher, Dr. Fred R. | Biochemistry Study Section | 1983-84 |
| Butcher, Dr. Reginald W. | Metabolism Study Section | 1975-78 |
| Butler, Dr. Albert B. | Neurological Sciences Study Section | 1981-83 |
| Butler, Dr. Elmer G. | Cell Biology Study Section | 1958-61 |
| Butler, Dr. Vincent P., Jr. | Immunological Sciences Study Section | 1980-83 |
| Button, Dr. John | Biochemistry Study Section | 1986-87 |
| Cahall, Dr. George F. | Metabolism Study Section | 1968-70 |
| Calabrese, Dr. Paul | Experimental Therapeutics Study Section | 1975-76 |
| Caldwell, Dr. Ruth B. | Visual Sciences C Study Section | 1992-94 |
| Calkins, Dr. Evan | Arthritis and Metabolic Diseases Study Section | 1968-69 |
| Campaigne, Dr. E. E. | Medical Chemistry B Study Section | 1960-64 |
| Campbell, Dr. Byron A. | Bio-Psychology Study Section | 1978-79 |
| Campbell, Dr. Richard T. | Human Development and Aging Study Section | 1989-90 |
| Cannon, Dr. Janne G. | Bacteriology and Mycology I Study Section | 1994-96 |
| Cannon, Dr. Paul J. | Diagnostic Radiology Study Section | 1985-87 |
| Cannon, Dr. Paul R. | Toxicology Study Section | 1959-62 |
| Cannon, Dr. Paul R. | Pathology Study Section | 1946-51 |
| Cant, Dr. Nell B. | Hearing Research Study Section | 1986-89 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|----------------------------|----------------------------------------------------------|---------|
| Cantley, Dr. Lewis C., Jr. | Physical Biochemistry Study Section | 1993-95 |
| Caprioli, Dr. Joseph | Visual Sciences A Study Section | 1994-96 |
| Carlson, Dr. Don M. | Physiological Chemistry Study Section | 1983-85 |
| Carlson, Dr. Gary P. | Toxicology Study Section | 1984-86 |
| Carpenter, Dr. Malcolm B. | Neurology A Study Section | 1971-72 |
| Carr, Dr. Bruce R. | Reproductive Endocrinology Study Section | 1992-94 |
| Carter, Dr. H. E. | Biochemistry Study Section | 1954-56 |
| Carter, Dr. John R. | Pathology A Study Section | 1962-65 |
| Cartwright, Dr. George E. | Hematology Study Section | 1973-75 |
| Caskey, Dr. Charles T. | Mammalian Genetics Study Section | 1982-86 |
| Cassell, Dr. Gail H. | Bacteriology and Mycology Study Section | 1988-91 |
| Cassell, Dr. John C. | Epidemiology and Disease Control Study Section | 1968-69 |
| Castellino, Dr. Francis J. | Hematology II Study Section | 1992-94 |
| Caughey, Dr. John L. | Biomedical Communications Study Section | 1965-67 |
| Cavanagh, Dr. H. Dwight | Visual Sciences A Study Section | 1982-84 |
| Center, Dr. David M. | Lung Biology and Pathology Study Section | 1992-94 |
| Chalfie, Dr. Martin | Molecular Cytology Study Section | 1994-96 |
| Chambers, Dr. Leslie A. | Environmental Sciences Review Committee | 1966-67 |
| Chan, Dr. Sunney I. | Physical Biochemistry Study Section | 1991-93 |
| Chang, Dr. R. Jeffrey | Reproductive Biology Study Section | 1991-93 |
| Chapham, Dr. David E. | Physiology Study Section | 1994-96 |
| Chapman, Dr. Robin S. | Human Development and Aging III Study Section | 1992-94 |
| Chassin, Dr. Laurie A. | Behavioral Medicine Study Section | 1991-93 |
| Chasteen, Dr. Norman D. | Metallobiochemistry Study Section | 1986-88 |
| Childress, Dr. Dudley S. | Applied Physiology and Orthopedics Study Section | 1977-78 |
| Chin, Dr. William W. | Endocrinology Study Section | 1994-96 |
| Choppin, Dr. Fumell W. | Virology Study Section | 1975-78 |
| Cicerone, Dr. Carol M. | Visual Sciences B Study Section | 1993-95 |
| Clarke, Dr. Hans T. | Antibiotics Study Section | 1946-49 |
| Clayton, Dr. David A. | Molecular Biology Study Section | 1984-86 |
| Clemmons, Dr. David R. | Cellular Biology and Physiology Study Section | 1989-90 |
| Clowes, Dr. Royston C. | Microbial Chemistry Study Section | 1973-75 |
| Coates, Dr. Robert M. | Bio-Organic and Natural Products Chemistry Study Section | 1985-86 |
| Cohen, Dr. Carl | Immunobiology Study Section | 1973-75 |
| Cohen, Dr. David H. | Neurology A Study Section | 1983-87 |
| Cohen, Dr. Harvey J. | Hematology Study Section | 1986-88 |
| Cohen, Dr. Leslie B. | Human Development and Aging Study Section | 1987-89 |
| Cohen, Dr. Samuel M. | Immunology, Virology, and Pathology Study Section | 1989-93 |
| Cohen, Dr. Sidney | General Medicine A Study Section | 1985-86 |
| Cole, Dr. Michael F. | Oral Biology and Medicine I Study Section | 1993-94 |
| Coleman, Dr. Mary S. | Medical Biochemistry Study Section | 1992-94 |
| Coller, Dr. Frederick A. | Surgery Study Section | 1946-51 |
| Compans, Dr. Richard W. | Virology Study Section | 1992-94 |
| Comroe, Dr. Julius H., Jr. | Physiology Study Section | 1955-58 |
| Condeelis, Dr. John S. | Cellular Biology and Physiology Study Section | 1991-93 |
| Conley, Dr. C. Lockard | Hematology Study Section | 1962-65 |
| Conte, Dr. John E., Jr. | AIDS and Related Research Study Section 5 | 1992-94 |
| Conway, Dr. Thomas W. | Physiological Chemistry Study Section | 1976-78 |
| Coon, Dr. J. M. | Toxicology Study Section | 1962-64 |
| Cooper, Dr. Franklin S. | Communicative Sciences Study Section | 1974-76 |
| Cooper, Dr. Terrance G. | Biochemistry Study Section | 1982-83 |
| Corwin, Dr. Jeffrey T. | Hearing Research Study Section | 1991-93 |
| Costanzo, Dr. Philip R. | Human Development and Aging Study Section | 1984-87 |
| Costello, Dr. Donald P. | Cell Biology B Study Section | 1966-67 |
| Cotran, Dr. Ramzi S. | Pathology A Study Section | 1980-82 |
| Courmand, Dr. Andre | Cardiovascular Study Section | 1957-59 |
| Courser, Dr. William G. | Pathology A Study Section | 1988-89 |
| Cox, Dr. Rody P. | Genetics Study Section | 1978-81 |
| Croftord, Dr. Oscar B. | Metabolism Study Section | 1972-74 |
| Cromwell, Dr. Norman H. | Medical Chemistry Study Section | 1960-63 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|---------------------------------|--------------------------------------------------------|---------|
| Cronbach, Dr. Lee J. | Experimental Psychology Study Section | 1957-58 |
| Crothers, Dr. Donald M. | Biophysics and Biophysical Chemistry B Study Section | 1974-76 |
| Crow, Dr. James F. | Mammalian Genetics Study Section | 1986-89 |
| Crow, Dr. James F. | Genetics Study Section | 1966-69 |
| Cunningham-Rundles, Dr. Susanna | AIDS and Related Research Study Section 1 | 1994-96 |
| Curran, Dr. Peter P. | Physiology Study Section | 1974-75 |
| Currenti, Dr. P. William | Surgery, Anesthesiology and Trauma Study Section | 1986-88 |
| Curtis, Dr. Howard J. | Committee on Radiation Studies | 1955 |
| Curtis, Dr. Howard J. | Radiation Study Section | 1955-59 |
| Curtis, Dr. James F. | Communicative Sciences Study Section | 1972-74 |
| Curtis, Dr. Stephanie E. | Biological Sciences Study Section | 1991-93 |
| Cutler, Dr. Stephen J. | Human Development and Aging Study Section | 1990-92 |
| D'Alesandro, Philip A. | Tropical Medicine and Parasitology Section | 1977-80 |
| Dack, Dr. Gail M. | Committee on Sectional Research in Microbiology | 1951-55 |
| Dack, Dr. Gail M. | Bacteriology Study Section | 1946-49 |
| Dack, Dr. Gail M. | Microbiology and Immunology Study Section | 1949-51 |
| Dahlstrom, Dr. W. Grant | Mental Health B Study Section | 1966-67 |
| Dallman, Dr. Peter R. | Nutrition Study Section | 1977-79 |
| Damian, Dr. Raymond T. | Tropical Medicine and Parasitology Study Section | 1980-83 |
| Danforth, Dr. William H. | Cardiovascular A Study A Section | 1970 |
| Darby, Dr. William J. | Metabolism and Nutrition Study Section | 1951-53 |
| Darby, Dr. William J. | General Medicine Study Section | 1957-59 |
| Darby, Dr. William J. | Nutrition Study Section | 1959-61 |
| Darling, Dr. Robert C. | Applied Physiology Study Section | 1966-67 |
| Das-Gupta, Dr. Tapas K. | Experimental Therapeutics Study Section | 1986-88 |
| Davidson, Dr. Jeffrey | Pathobiochemistry Study Section | 1994-96 |
| Davidson, Dr. Norman | Biophysics and Biophysical Chemistry B Study Section | 1966-68 |
| Davie, Dr. Joseph M. | Pathology B Study Section | 1977-78 |
| Davis, Dr. Bernard B. | Physiological Sciences Study Section | 1990-92 |
| Davis, Dr. John H. | Surgery, Anesthesiology and Trauma Study Section | 1983-84 |
| Davis, Dr. Rowland | Genetics Study Section | 1982-88 |
| Davy, Dr. Dwight T. | Orthopedics and Musculoskeletal Study Section | 1991-93 |
| Dawson, Dr. Chandler R. | Visual Sciences A Study Section | 1976-78 |
| Daynes, Dr. Raymond A. | Immunobiology Study Section | 1989-91 |
| DeCrombrughe, Dr. Benoit | Pathobiochemistry Study Section | 1992-94 |
| Deen, Dr. Dennis F. | Experimental Therapeutics Study Section | 1988-89 |
| Demaria, Dr. Anthony N. | Diagnostic Radiology Study Section | 1991-93 |
| Demeny, Dr. Paul G. | Population Research Study Section | 1976-78 |
| DeMoss, Dr. John A. | Microbial Physiology and Genetics Study Section | 1989-91 |
| Dempfle, Dr. Bruce | Chemical Pathology Study Section | 1992-94 |
| Denbesten, Dr. Pamela K. | Oral Biology and Medicine II Study Section | 1995-96 |
| Deuel, Dr. Thomas F. | Hematology Study Section | 1991-93 |
| Diamond, Dr. Randall L. | Cellular Biology and Physiology Study Section | 1984-86 |
| DiBona, Dr. Gerald F. | Cardiovascular and Renal Study Section | 1988-90 |
| DiCorleto, Dr. Paul E. | Cellular Biology and Physiology Study Section | 1990-91 |
| Diil, Dr. David B. | Applied Physiology Study Section | 1964-66 |
| Dillon, Dr. Hugh D. | Bacteriology and Mycology Study Section | 1983-84 |
| Dingle, Dr. John H. | Virology and Rickettsiology Study Section | 1958-62 |
| Dixon, Dr. Jack E. | Endocrinology Study Section | 1989-90 |
| Dixon, Dr. Wilfred J. | Computer Research Study Section | 1967-68 |
| Doan, Dr. Charles A. | Hematology Study Section | 1947-51 |
| Dobson, Dr. Richard L. | General Medicine A Study Section | 1970-72 |
| Doi, Dr. Roy H. | Microbial Study Section | 1977-79 |
| Don, Dr. Manuel | Sensory Disorders and Language Disorders Study Section | 1989-91 |
| Donaldson, Dr. Sue K. | Physiology Study Section | 1988-89 |
| Donelson, Dr. John E. | Physiological Chemistry Study Section | 1985-86 |
| Doroshov, Dr. James H. | Experimental Therapeutics II Study Section | 1990-92 |
| Dover, Dr. George J. | Hematology Study Section | 1991-92 |
| Doyle, Dr. Darrell J. | Molecular Biology Study Section | 1977-78 |
| Dragstadt, Dr. Carl A. | Pharmacology Study Section | 1951-53 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|-------------------------------|-------------------------------------------------------|---------|
| Drezner, Dr. Marc K. | General Medicine B Study Section | 1987-89 |
| Dubanu, Dr. David A. | Microbial Physiology Study Section | 1986-88 |
| Duckworth, Dr. William C. | Metabolism Study Section | 1990-92 |
| Duffy, Dr. John | History of Life Sciences Study Section | 1970-71 |
| Durban, Dr. Elisa M. | Oral Biology and Medicine I Study Section | 1995-96 |
| Easter, Dr. Stephen S. | Visual Sciences B Study Section | 1979-82 |
| Eaton, Dr. Douglas C. | Physiology Study Section | 1986-88 |
| Eberlein, Dr. Timothy J. | Experimental Therapeutics II Study Section | 1992-95 |
| Ebner, Dr. Timothy J. | International and Cooperative Projects Study Section | 1994-96 |
| Eccles, Dr. Jacquelynn S. | Human Development and Aging I Study Section | 1992-94 |
| Eckel, Dr. Robert H. | Nutrition Study Section | 1991-93 |
| Eckman, Dr. James R. | Behavioral Medicine Study Section | 1988-90 |
| Eckstein, Dr. John W. | Cardiovascular A Study Section | 1970-71 |
| Eckstein, Dr. John W. | Cardiovascular and Pulmonary Research A Study Section | 1971-72 |
| Edds, Dr. M. V., Jr. | Cell Biology Study Section | 1961-64 |
| Edelhauser, Dr. Henry F. | Visual Sciences A Study Section | 1980-81 |
| Edelmann, Dr. Chester M., Jr. | General Medicine B Study Section | 1973-75 |
| Edmonds, Dr. L. Henry, Jr. | Surgery and Bioengineering Study Section | 1984-85 |
| Egdahl, Dr. Richard H. | Surgery A Study Section | 1974-76 |
| Ehlers, Dr. V. M. | Sanitation Study Section | 1946-49 |
| Ehlers, Dr. V. M. | Environmental Health Study Section | 1949-51 |
| Eik-Nes, Dr. Kristen B. | Reproductive Biology Study Section | 1968-70 |
| Eilers, Dr. Rebecca | Human Development and Aging Study Section | 1988-89 |
| Eisen, Dr. Herman N. | Allergy and Immunology A Study Section | 1964-66 |
| Eisenberg, Dr. Howard M. | Neurology A Study Section | 1987-91 |
| Eisenberg, Dr. Robert S. | Physiology Study Section | 1981-83 |
| Eliel, Dr. Leonard P. | Cancer Program Program-Project Committee | 1961-65 |
| Elizondo, Dr. Reynaldo S. | Nutrition Study Section | 1989-91 |
| Elles, Dr. John T. | Pathology A Study Section | 1970 |
| Ellis, Dr. Philip P. | Visual Sciences A Study Section | 1973-75 |
| Elmer, Dr. Jerrold J. | Bacteriology and Mycology Study Section | 1987-89 |
| Elson, Dr. Elliott | Biophysics and Biophysical Chemistry A Study Section | 1977-79 |
| Enders, Dr. Allen C. | Human Embryology and Development Study Section | 1976-79 |
| Engle, Dr. Jerome, Jr. | Biomedical Sciences Study Section | 1988-89 |
| Engle, Dr. Jerome, Jr. | International and Cooperative Projects Study Section | 1989-90 |
| Engle, Dr. Ruben W. | Nutrition Study Section | 1964-66 |
| Engleman, Dr. Donald M. | Molecular Biology Study Section | 1979-80 |
| Enquest, Dr. Lynn W. | Experimental Virology Study Section | 1990-92 |
| Ernest, Dr. J. Terry | Visual Sciences A Study Section | 1978-79 |
| Esser, Dr. Alfred F. | Biophysical Chemistry Study Section | 1988-90 |
| Essigmann, Dr. John M. | Chemical Pathology Study Section | 1988-90 |
| Evans, Dr. Slayton A., Jr. | Biomedical Sciences Study Section | 1989-91 |
| Everett, Dr. Newton B. | Cell Biology Study Section | 1965-66 |
| Everett, Dr. Newton B. | Cell Biology A Study Section | 1966-67 |
| Eyzaguirre, Dr. Carlos | Neurology A Study Section | 1973-74 |
| Fair, Mr. Gordon | Public Health and Sanitation Study Section | 1953-54 |
| Fair, Mr. Gordon | Environmental Health Study Section | 1952-53 |
| Fairbairn, Dr. Donald | Tropical Medicine and Parasitology Study Section | 1965-66 |
| Fan, Dr. Hung Y. | Clinical Sciences Study Section | 1986-87 |
| Fanestil, Dr. Darrell D. | General Medicine A Study Section | 1973-74 |
| Farber, Dr. Emmanuel | Pathology B Study Section | 1963-66 |
| Farber, Dr. Emmanuel | Metabolic Pathology Study Section | 1989-90 |
| Farber, Dr. I. E. | Psychopharmacology Study Section | 1966-67 |
| Fathman, Dr. C. Garrison | Immunological Sciences Study Section | 1989-90 |
| Fausto, Dr. Nelson | Pathology B Study Section | 1988-91 |
| Feldman, Dr. Joseph D. | Pathology B Study Section | 1967-70 |
| Feldman, Dr. Marcus W. | Genetics Study Section | 1980-82 |
| Feldman, Dr. Martin L. | Hearing Research Study Section | 1984-86 |
| Felton, Dr. Geraldine | Nursing Research Study Section | 1988-91 |
| Fender, Dr. Derek H. | Visual Sciences B Study Section | 1972-74 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|------------------------------|----------------------------------------------------------|---------|
| Feng, Dr. Albert S. | Hearing Research Study Section | 1994-96 |
| Fenn, Dr. Wallace O. | Physiology Study Section | 1946-51 |
| Ferguson, Dr. Ronald M. | Surgery, Anesthesiology and Trauma Study Section | 1993-95 |
| Ferguson, Dr. William W. | Bacteriology and Mycology Study Section | 1958-60 |
| Ferl, Dr. Robert J. | Biological Sciences Study Section | 1989-90 |
| Fernandez, Dr. Hugo L. | Behavioral and Neurosciences Study Section | 1989-91 |
| Ferrieri, Dr. Patricia | Bacteriology and Mycology Study Section | 1984-85 |
| Field, Dr. James B. | Endocrinology Study Section | 1967-69 |
| Fielding, Dr. Christopher J. | Metabolism Study Section | 1992-94 |
| Fields, Dr. Bernard | Experimental Virology Study Section | 1979-81 |
| Filer, Dr. Lloyd J., Jr. | Nutrition Study Section | 1971-73 |
| Finerman, Dr. Gerald A. M. | Applied Physiology and Orthopedics Study Section | 1980-81 |
| Finerman, Dr. Gerald A. M. | Orthopedics and Musculoskeletal Study Section | 1981-82 |
| Fink, Dr. Gregory D. | Experimental Cardiovascular Sciences Study Section | 1988-89 |
| Finkelstein, Dr. Daniel | Visual Sciences A Study Section | 1984-85 |
| Fischer-Lindahl, Dr. Kirsten | Immunobiology Study Section | 1993-94 |
| Fischman, Dr. Donald A. | Molecular Cytology Study Section | 1981-83 |
| Fisher, Dr. Steven K. | Visual Sciences C Study Section | 1991-92 |
| Fisher, Dr. Steven K. | Visual Sciences A Study Section | 1990-91 |
| Fishman, Dr. Jack | Endocrinology Study Section | 1982-84 |
| Fitzgerald, Dr. Garrett A. | Biochemistry Study Section | 1989-90 |
| Fitzgerald, Dr. Robert H. | Orthopedics and Musculoskeletal Study Section | 1989-91 |
| Folkman, Dr. M. Judah | Pathology Study Section | 1992-94 |
| Forsham, Dr. Peter H. | Metabolism Study Section | 1959 |
| Forsham, Dr. Peter H. | Metabolism and Nutrition Study Section | 1958-59 |
| Forster, Dr. Francis M. | Neurology Study Section | 1953-56 |
| Forte, Dr. John G. | Physiology Study Section | 1976-78 |
| Foster, Dr. Daniel W. | Metabolism Study Section | 1970-72 |
| Fox, Dr. John P. | Virology and Rickettsiology Study Section | 1962-64 |
| Fozzard, Dr. Harry A. | Physiology Study Section | 1973-74 |
| Francke, Dr. Uta | Mammalian Genetics Study Section | 1992-94 |
| Franklin, Dr. Renty B. | Reproductive Endocrinology Study Section | 1994-96 |
| Freeborn, Dr. Stanley B. | Tropical Medicine and Parasitology Study Section | 1959-60 |
| Freeman, Dr. Ruth | Nursing Research Study Section | 1959-62 |
| Fried, Dr. Josef | Medicinal Chemistry A Study Section | 1971-72 |
| Friedell, Dr. Hymer L. | Radiation Study Section | 1962-65 |
| Friedenwald, Dr. Jonas | Sensory Diseases Study Section | 1951-54 |
| Friedkin, Dr. Morris E. | Pharmacology B Study Section | 1970-71 |
| Friedman, Dr. Paul A. | Biochemistry Study Section | 1987-89 |
| Fry, Dr. Robert L. | Cardiovascular and Renal Study Section | 1979-81 |
| Fry, Dr. William W. | Tropical Medicine and Parasitology Study Section | 1950-55 |
| Fune, Dr. Barbara | Hematology Study Section | 1988-90 |
| Gall, Dr. Joseph G. | Cell Biology Study Section | 1972-74 |
| Galloway, Dr. Denise A. | Experimental Virology Study Section | 1987-88 |
| Ganschow, Dr. Roger E. | Biological Sciences 1 Study Section | 1994-96 |
| Ganz, Dr. Patricia | Behavioral Medicine Study Section | 1993-95 |
| Garant, Dr. Philip R. | Oral Biology and Medicine Study Section | 1976-78 |
| Garcia-Hill, Dr. Edgar E. | Bio-Psychological Study Section | 1991-93 |
| Garner, Dr. Gretchen Ann | Mental Health Study Section | 1959-60 |
| Garner, Dr. Wendell R. | Experimental Psychology Study Section | 1970-72 |
| Garvey, Dr. M. Bernadette | AIDS and Related Research Study Section 5 | 1990-92 |
| Gaylor, Dr. James L. | Physiological Chemistry Study Section | 1979-81 |
| Gebheart, Dr. Gerald F. | Neurological Sciences Study Section | 1988-90 |
| Geer, Dr. Jack C. | Pathology A Study Section | 1978-80 |
| Gelhorn, Dr. Alfred | Pharmacology and Experimental Therapeutics Study Section | 1953-55 |
| Gelhorn, Dr. Alfred | Experimental Therapeutics Study Section | 1951-53 |
| Gellis, Dr. Sidney S. | Human Embryology and Development Study Section | 1967-69 |
| Gerrall, Dr. Arnold A. | Experimental Psychology Study Section | 1976-78 |
| Gerstmann, Dr. Merrill E. | General Medicine A I Study Section | 1992-94 |
| Geschwind, Dr. Irving I. | Endocrinology Study Section | 1970-71 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|--------------------------------|----------------------------------------------------------|---------|
| Gest, Dr. Howard | Microbial Chemistry Study Section | 1968-69 |
| Getchell, Dr. Thomas V. | Sensory Disorders and Language Study Section | 1982-85 |
| Gething, Dr. Mary-Jane | Cellular Biology and Physiology Study Section | 1988-89 |
| Getz, Dr. Michael J. | Biological Sciences II Study Section | 1993-95 |
| Ghishan, Dr. Fayez K. | General Medicine A II Study Section | 1993-95 |
| Giepp, Dr. Randall | Surgery and Bioengineering Study Section | 1992-94 |
| Gigli, Dr. Irma | Allergy and Immunology Study Section | 1980-83 |
| Gilbert, Dr. Hiram F. | Biomedical Sciences Study Section | 1993-95 |
| Gildea, Dr. Edwin F. | Mental Health Study Section | 1951-53 |
| Gill, Dr. Gordon N. | Endocrinology Study Section | 1979-80 |
| Gillman, Dr. Alfred | Pharmacology and Experimental Therapeutics Study Section | 1956-60 |
| Gilmore, Dr. Shirley A. | Neurology Study Section | 1991-93 |
| Gilula, Dr. Norton B. | Molecular Biology Study Section | 1980-81 |
| Gimbrone, Dr. Michael A., Jr. | Pathology A Study Section | 1987-88 |
| Ginsburg, Dr. Harold S. | Virology Study Section | 1970-72 |
| Gleich, Dr. Gerald J. | Immunological Sciences Study Section | 1985-88 |
| Glick, Dr. David | Molecular Biology Study Section | 1967-70 |
| Glickman, Dr. Stephen E. | Bio-Psychology Study Section | 1979-83 |
| Godson, Dr. G. Nigel | Tropical Medicine and Parasitology Study Section | 1988-89 |
| Goldberg, Dr. Ellen H. | Reproductive Biology Study Section | 1989-91 |
| Goldberg, Dr. Nelson D. | Biochemistry Study Section | 1983-85 |
| Goldennd, Dr. Sidney | Neurology A Study Section | 1972-73 |
| Goldhaber, Dr. Paul | Dental Study Section | 1969-71 |
| Goldman, Dr. James E. | Neurology C Study Section | 1989-92 |
| Goldsmith, Dr. Lowell A. | General Medicine A I Study Section | 1990-92 |
| Goldslein, Dr. Bernard D. | Toxicology Study Section | 1982-84 |
| Goldslein, Dr. Ira M. | General Medicine A Study Section | 1980-82 |
| Goldstein, Dr. Steven A. | Orthopedics and Musculoskeletal Study Section | 1993-95 |
| Gomer, Dr. Charles J. | Radiation Study Section | 1992-94 |
| Good, Dr. Mary L. | Medicinal Chemistry B Study Section | 1975-76 |
| Goodman, Dr. Murry | Medicinal Chemistry A Study Section | 1972-74 |
| Gough, Dr. Philip B. | Human Development Study Section | 1980-81 |
| Goy, Dr. Robert W. | Experimental Psychology Study Section | 1972-74 |
| Graham, Dr. Doyle G. | Toxicology Study Section | 1987-88 |
| Graham, Dr. George G. | Nutrition Study Section | 1973-75 |
| Grand, Dr. Richard J. | General Medicine A Study Section | 1988-90 |
| Gray, Dr. John S. | Physiology Study Section | 1952-55 |
| Green, Dr. Keith | Visual Sciences A Study Section | 1981-82 |
| Greenberg, Dr. Bernard G. | Nursing Research Study Section | 1962-64 |
| Greenberg, Dr. Michael E. | Neurology C Study Section | 1994-96 |
| Greenberg, Dr. Raymond | Epidemiology and Disease Control 2 Study Section | 1992-94 |
| Greenfield, Dr. Joseph C., Jr. | Cardiovascular and Pulmonary Study Section | 1975-78 |
| Greenough, Dr. William B., III | Bacteriology and Mycology Study Section | 1974-76 |
| Greenwald, Dr. Tibor J. | Hematology Study Section | 1970-72 |
| Gnce, Dr. G. Robert | Experimental Psychology Study Section | 1968-69 |
| Griem, Dr. Melvin L. | Radiation Study Section | 1977-79 |
| Griffith, Dr. Jack D. | AIDS and Related Research Study Section 3 | 1992-94 |
| Griffith, Dr. Owen W. | Medical Biochemistry Study Section | 1990-92 |
| Griffith, Dr. Wendell H. | Biochemistry Study Section | 1951-53 |
| Grim, Dr. Eugene D. | Physiology Study Section | 1970-71 |
| Grimson, Dr. Keith S. | Cardiovascular Study Section | 1954-56 |
| Grinker, Dr. Roy R. | Psychopharmacology Study Section | 1961-63 |
| Gnsham, Dr. Joe W. | Pathology A Study Section | 1970-73 |
| Grisham, Dr. Joe W. | Pathology B Study Section | 1979-83 |
| Gross, Dr. Paul R. | Cell Biology Study Section | 1974-76 |
| Grossman, Dr. Lawrence | Biochemistry Study Section | 1976-77 |
| Grossman, Dr. Robert G. | Neurology B Study Section | 1972-74 |
| Gunnar, Dr. Megan R. | Human Development and Aging Study Section | 1989-92 |
| Gurd, Dr. Frank R. N. | Biophysics and Biophysical Chemistry B Study Section | 1968-70 |
| Gutman, Dr. Alexander B. | Metabolism and Nutrition Study Section | 1956-57 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|-------------------------------|------------------------------------------------------|---------|
| Gutsche, Dr. C. David | Medicinal Chemistry Study A Study Section | 1978-81 |
| Hackenberg, Dr. Robert A. | Population Research Study Section | 1974-76 |
| Hagen, Dr. John W. | Behavioral and Neurosciences Study Section | 1986-88 |
| Hager, Dr. Lowell P. | Physiological Chemistry Study Section | 1968-69 |
| Hagsted, Dr. D. Mark | Nutrition Study Section | 1961-64 |
| Hahn, Dr. Berva H. | Immunological Sciences Study Section | 1983-85 |
| Hahn, Dr. William E. | Molecular Biology Study Section | 1981-82 |
| Halpern, Dr. Jack | Medicinal Chemistry B Study Section | 1976-79 |
| Halpert, Dr. James R. | Pharmacology Study Section | 1993-95 |
| Hamilton, Dr. Joseph E. | Radiobiology Study Section | 1946-49 |
| Hamilton, Dr. William K. | Surgery, Anesthesiology and Trauma Study Section | 1978-80 |
| Hammerling, Dr. Ulrich G. | Immunobiology Study Section | 1994-96 |
| Hammond, Dr. James M. | Biochemical Endocrinology Study Section | 1989-91 |
| Hanahan, Dr. Donald J. | Molecular Cytology Study Section | 1979-81 |
| Handler, Dr. Philip | Biochemistry Study Section | 1956-58 |
| Handion, Dr. C. Rollins | Surgery B Study Section | 1965-66 |
| Handschumacher, Dr. Robert E. | Experimental Therapeutics Study Section | 1979-82 |
| Hansen, Dr. R. Gaurth | Nutrition Study Section | 1970-71 |
| Hansen, Richard W. | Biochemistry Study Section | 1977-78 |
| Haps, Dr. Harold D. | Reproductive Biology Study Section | 1976-80 |
| Harden, Dr. Robert I. | Hematology II Study Section | 1994-96 |
| Hardman, Dr. Joel G. | Pharmacology Study Section | 1977-79 |
| Harik, Dr. Sami I. | International and Cooperative Projects Study Section | 1992-94 |
| Harrell, Dr. George T., Jr. | General Medical Research Program-Project Committee | 1961-65 |
| Harris, Dr. John W. | Hematology Study Section | 1983-85 |
| Harrison, Dr. David G. | Experimental Cardiovascular Sciences Study Section | 1994-96 |
| Hartl, Dr. Daniel L. | Genetics Study Section | 1979-80 |
| Hartmann, Dr. J. Francis | Neurology A Study Section | 1966-67 |
| Harvey, Dr. John A. | Bio-Psychology Study Section | 1983-85 |
| Hasher, Dr. Lynn Ann | Behavioral and Neurosciences II Study Section | 1993-95 |
| Hasselkorn, Dr. Robert | Virology Study Section | 1978-80 |
| Hassell, Dr. Thomas | Oral Biology and Medicine Study Section | 1986-88 |
| Haverback, Dr. Bernard J. | General Medicine A Study Section | 1972-73 |
| Hawthorne, Dr. Victor M. | Epidemiology and Disease Control Study Section | 1981-83 |
| Hay, Dr. William W., Jr. | Human Embryology and Development 1 Study Section | 1993-95 |
| Hayes, Dr. Wayland J., Jr. | Toxicology Study Section | 1970-72 |
| Hazlett, Dr. Linda D. | Visual Sciences A Study Section | 1992-94 |
| Heaney, Dr. Robert P. | General Medicine B Study Section | 1970-71 |
| Heath, Dr. Edward C. | Physiological Chemistry Study Section | 1975-76 |
| Heathcock, Dr. Clayton H. | Medicinal Chemistry Study Section | 1981-83 |
| Heinrichs, Dr. William L. | Human Embryology and Development Study Section | 1979-81 |
| Heiple, Dr. Kingsbury G. | Applied Physiology and Bioengineering Study Section | 1976-77 |
| Held, Dr. Richard | Experimental Psychology B Study Section | 1966-68 |
| Hellman, Dr. Louis M. | Human Embryology and Development Study Section | 1955-57 |
| Helsinki, Dr. Donald R. | Microbial Physiology and Genetics Study Section | 1985-87 |
| Hench, Dr. Philip | Arthritis and Rheumatism Study Section | 1949-50 |
| Henderson, Dr. La Vell M. | Nutrition Study Section | 1975-77 |
| Henderson, Dr. Maureen M. | Epidemiology and Disease Control Study Section | 1970-71 |
| Heppel, Dr. Leon A. | Biochemistry Study Section | 1970-72 |
| Hercowitz, Dr. Herbert B. | Experimental Immunology Study Section | 1990-93 |
| Herd, Dr. Alan | Behavioral Medicine Study Section | 1982-84 |
| Herman, Dr. Chester J. | Pathology B Study Section | 1991-94 |
| Hersey, Dr. Stephen J. | Clinical Sciences Study Section | 1991-93 |
| Hershey, Dr. John W. B. | Physiological Chemistry Study Section | 1966-68 |
| Hickam, Dr. John B. | Cardiovascular Study Section | 1959-63 |
| Highstein, Dr. Stephen M. | Hearing Research Study Section | 1983-84 |
| Hill, Dr. Robert L. | Physiological Chemistry Study Section | 1970-73 |
| Hill, Dr. Walter E. | Physiological Chemistry Study Section | 1994-96 |
| Hillman, Dr. Donald J. | Biomedical Communications Study Section | 1970 |
| Hirschman, Dr. Charles | Social Sciences and Population Study Section | 1989-91 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|-------------------------------|--------------------------------------------------------------|------------------|
| Hirst, Dr. George K. | Virology and Rickettsiology Study Section | 1967-68 |
| Hixson, Dr. Douglas C. | Chemical Pathology Study Section | 1990-92 |
| Hodson, Dr. Ernest | Toxicology Study Section | 1988-89 |
| Hoffman, Dr. Brian M. | Metallobiochemistry Study Section | 1990-92 |
| Hogan, Dr. Dennis P. | Social Sciences and Population Study Section | 1991-93 |
| Hogan, Dr. Edward L. | Neurology B Study Section | 1983-85 |
| Hogle, Dr. James M. | Biophysical Chemistry Study Section | 1993-95 |
| Holland, Dr. Michael J. | Biochemistry Study Section | 1986-87 |
| Hollingsworth, Dr. Dorothy R. | Epidemiology and Disease Control Study Section | 1984-86 |
| Holly, Dr. Roy G. | Child Health and Human Development Program-Project Committee | 1965-67 |
| Holzemer, Dr. William L. | AIDS and Related Research Study Section 6 | 1994-96 |
| Hook, Dr. Magnus | Pathobiochemistry Study Section | 1986-88 |
| Horecker, Dr. Bernard L. | Physiological Chemistry Study Section | 1962-64 |
| Horowicz, Dr. Paul | Physiology Study Section | 1971-73 |
| Horvath, Dr. Steven M. | Applied Physiology Study Section | 1968-72 |
| Horwitz, Dr. Marshall S. | Experimental Virology Study Section | 1985-87 |
| Houser, Dr. Carolyn R. | Neurological Sciences II Study Section | 1994-96 |
| Howard, Dr. Darlene V. | Human Development and Aging II Study Section | 1994-96 |
| Howe, Dr. Geoffrey R. | Epidemiology and Disease Control Study Section | 1990-92 |
| Hoyer, Dr. William J. | Human Development and Aging Study Section | 1988-89 |
| Hubel, Dr. Kenneth A. | General Medicine A Study Section | 1986-88 |
| Huennekens, Dr. Frank M. | Experimental Therapeutics Study Section | 1974-75 |
| Huggins, Dr. Charles B. | Endocrinology Study Section | 1952-54 |
| Hulka, Dr. Barbara S. | Epidemiology and Disease Control Study Section | 1981-83 |
| Hunt, Dr. Howard F. | Psychopharmacology Study Section | 1959-61 |
| Hurley, Dr. Laurence H. | Bio-Organic and Natural Products Chemistry Study Section | 1986-88 |
| Huston, Dr. David P. | Clinical Sciences Study Section | 1988-89 |
| Huttenlocher, Dr. Peter R. | Human Development and Aging Study Section | 1989-92 |
| Ilie, Dr. James N. | Cellular Biology and Physiology Study Section | 1991-93 |
| Ingbar, Dr. Sidney H. | Endocrinology Study Section | 1971-73 |
| Ingelfinger, Dr. Franz J. | Biomedical Communications Study Section | 1970-72 |
| Irons, Dr. Richard D. | Toxicology Study Section | 1986-87 |
| Isaacson, Dr. Robert J. | Oral Biology and Medicine Study Section | 1980-82 |
| Iwata, Dr. Brian A. | Human Development and Aging Study Section | 1985-88 |
| Jackson, Dr. Dudley P. | Hematology Study Section | 1972-73, 1985-86 |
| Jackson, Dr. James S. | Human Development and Aging Study Section | 1985-86 |
| Jackson, Dr. William F. | Clinical Sciences II Study Section | 1994-96 |
| Jackson, Dr. Robert C. | Experimental Therapeutics Study Section | 1984-85 |
| Jacobson, Dr. Sharol F. | Nursing Research Study Section | 1993-95 |
| Jacox, Dr. Ada K. | AIDS and Related Research Study Section 6 | 1990-92 |
| Jacquez, Dr. John A. | Computer Research Study Section | 1968-70 |
| Jacquin, Dr. Mark F. | Neurological Sciences II Study Section | 1992-94 |
| Jaffe, Dr. Ernst R. | Hematology Study Section | 1979-81 |
| Jagiello, Dr. Georgiana M. | Reproductive Biology Study Section | 1974-76 |
| Jailer, Dr. Joseph W. | Cancer Chemotherapy Study Section | 1959-60 |
| Jamison, Dr. James D. | Molecular Cytology Study Section | 1978-79 |
| Jampolsky, Dr. Arthur | Visual Sciences Study Section | 1970-71 |
| Janeway, Dr. Charles A., Jr. | Immunobiology Study Section | 1991-93 |
| Janowitz, Dr. Henry D. | Arthritis and Metabolic Diseases Program-Project Committee | 1970 |
| Jarcho, Dr. Saul | History of Medicine Study Section | 1960-62 |
| Jarcho, Dr. Saul | History of Life Sciences Study Section | 1962-63 |
| Jeffcoat, Dr. Marjorie K. | Oral Biology and Medicine Study Section | 1988-90 |
| Jensen, Dr. Wallace N. | Hematology Study Section | 1975-77 |
| Johnson, Dr. Arthur G. | Bacteriology and Mycology Study Section | 1986-87 |
| Johnson, Dr. Francis E. | Applied Physiology and Bioengineering Study Section | 1972-73 |
| Johnson, Dr. Lysie E. | Oral Biology and Medicine Study Section | 1985-86 |
| Joklik, Dr. Wolfgang K. | Virology Study Section | 1973-75 |
| Jollow, Dr. David J. | Toxicology Study Section | 1981-82 |
| Jonasson, Dr. Oiga | Surgery, Anesthesiology and Trauma Study Section | 1980-82 |
| Jones, Dr. Elizabeth W. | Genetics Study Section | 1990-93 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|-------------------------------|------------------------------------------------------------|------------------|
| Julian, Dr. Fred J. | Physiology Study Section | 1979-81 |
| Jusczyk, Dr. Peter W. | Sensory Disorders and Language Study Section | 1993-95 |
| Kahan, Dr. Barry D. | Experimental Immunology Study Section | 1985-87 |
| Kallenbach, Dr. Neville R. | Molecular and Cellular Biophysics Study Section | 1981-84 |
| Kallio, Dr. R. E. | Microbial Chemistry Study Section | 1967-68 |
| Kaplan, Dr. Albert S. | Virology Study Section | 1972-73 |
| Kaplan, Dr. Albert S. | Experimental Virology Study Section | 1983-85 |
| Kaplan, Dr. George A. | Epidemiology and Disease I Control Study Section | 1991-93 |
| Kaplan, Dr. Henry J. | Visual Sciences A Study Section | 1987-89 |
| Kaplan, Dr. Jack H. | Physiology Study Section | 1989-92 |
| Katzenellenbogen, Dr. John A. | Bio-Organic and Natural Products Chemistry Study Section | 1989-91 |
| Kaufman, Dr. David G. | Chemical Pathology Study Section | 1982-83 |
| Kaufman, Dr. Marc P. | Respiratory and Applied Physiology Study Section | 1991-93 |
| Keene, Dr. Jack D. | Molecular Biology Study Section | 1993-95 |
| Kefalides, Dr. Nicholas A. | Pathobiochemistry Study Section | 1984-86 |
| Kelly, Dr. Douglas A. | Human Embryology and Development Study Section | 1983-85 |
| Kelly, Dr. Lowell E. | Accident Prevention Research Study Section | 1961-64 |
| Kelly, Dr. Thomas J. | Virology Study Section | 1988-90 |
| Kelsey, Dr. Jennifer L. | Epidemiology and Disease Control Study Section | 1983-86 |
| Kemp, Dr. Walter M. | Tropical Medicine and Parasitology Study Section | 1983-85 |
| Kende, Dr. Andrew S. | Medicinal Chemistry A Study Section | 1974-76 |
| Kennedy, Dr. Eugene P. | Microbial Physiology and Genetics Study Section | 1988-89 |
| Kent, Dr. Raymond D. | Sensory Disorders and Language Study Section | 1985-87 |
| Kenyon, Dr. George L. | Bio-organic and Natural Products Chemistry | 1993-95 |
| Kerchoff, Dr. Alan C. | Human Development Study Section | 1978-80 |
| Keutmann, Dr. Henry T. | Biochemical Endocrinology Study Section | 1988-89 |
| Kimble, Dr. Gregory A. | Experimental Psychology Study Section | 1962-64 |
| King, Dr. Charles G. | Biochemistry and Nutrition Study Section | 1946-51 |
| King, Dr. Jonathan A. | Microbial Physiology and Genetics Study Section | 1983-85 |
| King, Dr. Lester S. | History of Life Sciences Study Section | 1964-67 |
| Kingsbury, Dr. David W. | Virology Study Section | 1982-84 |
| Kinney, Dr. Thomas D. | Pathology Study Section | 1959-63 |
| Kinter, Dr. William B. | Physiology Study Section | 1966-69 |
| Kipnis, Dr. David M. | Endocrinology Study Section | 1966-67 |
| Kirklin, Dr. John W. | Surgery A Study Section | 1968-70 |
| Kirkman, Dr. Henry N. | Genetics Study Section | 1975-78 |
| Kirschbaum, Dr. Thomas H. | Human Embryology and Development Study Section | 1974-76 |
| Kirschner, Dr. Marc W. | Cellular Biology and Physiology Study Section | 1983-84 |
| Kirschner, Dr. Marc W. | Cell Biology Study Section | 1982-83 |
| Kirshner, Dr. Norman | Neurological Sciences Study Section | 1985-88 |
| Kirsten, Dr. Warner H. | Pathology B Study Section | 1970-71, 1973-76 |
| Kit, Dr. Saul | Pathobiological Chemistry Study Section | 1976-79 |
| Kitchin, Dr. Paul C. | Dental Study Section | 1946-48 |
| Kjelsberg, Dr. Marcus O. | Epidemiology and Disease Control Study Section | 1987-88 |
| Klahr, Dr. Saulo | General Medicine B Study Section | 1981-83 |
| Klotz, Dr. Irving M. | Biophysics and Biophysical Chemistry Study Section | 1963-66 |
| Knobil, Dr. Ernst | Reproductive Biology Study Section | 1966-68 |
| Knox, Dr. Franklyn G. | General Medicine B Study Section | 1985-87 |
| Knox, Dr. W. Eugene | Metabolism Study Section | 1964-66 |
| Knudson, Dr. Alfred G., Jr. | Genetics Study Section | 1972-75 |
| Kocke, Dr. Robert A. | Respiratory and Applied Physiology Study Section | 1989-91 |
| Koelle, Dr. George B. | Pharmacology and Experimental Therapeutics A Study Section | 1965-68 |
| Kohler, Dr. Peter O. | Endocrinology Study Section | 1984-85 |
| Komuneccki, Dr. Richard W. | Tropical Medicine and Parasitology Study Section | 1989-90 |
| Kontos, Dr. Hermes A. | Experimental Cardiovascular Sciences Study Section | 1984-86 |
| Korn, Dr. David | Cell Biology Study Section | 1976-77 |
| Kotchin, Dr. Theodore A. | Experimental Cardiovascular Sciences Study Section | 1986-88 |
| Kotzin, Dr. Brian L. | Immunological Sciences Study Section | 1990-92 |
| Kozel, Dr. Thomas R. | Bacteriology and Mycology Study Section | 1985-86 |
| Krakow, Dr. Joseph S. | Biochemistry Study Section | 1978-79 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|----------------------------|--------------------------------------------------------|---------|
| Kramer, Dr. Morton | Committee on Standards for Grants Surveys | 1955 |
| Krane, Dr. Stephen M. | Arthritis and Metabolic Diseases Study Section | 1972-73 |
| Krause, Dr. Richard M. | Allergy and Immunology A Study Section | 1966-70 |
| Krensky, Dr. Alan | Experimental Immunology Study Section | 1993-95 |
| Kreshover, Dr. Seymour J. | Dental Study Section | 1954-55 |
| Krieger, Dr. Dorothy T. | Endocrinology Study Section | 1980-82 |
| Krishan, Dr. Awtar | Experimental Therapeutics Study Section | 1985-88 |
| Krontiris, Dr. Theodore G. | Clinical Sciences Study Section | 1989-90 |
| Krupin, Dr. Theodore | Visual Sciences A Study Section | 1983-84 |
| Kuntz, Dr. Irwin D., Jr. | Molecular and Cellular Biophysics Study Section | 1988-89 |
| Kupchan, Dr. S. Morris | Medicinal Chemistry A Study Section | 1970-71 |
| Kurtzberg, Dr. Diane | Behavioral and Neurosciences Study Section | 1991-93 |
| La Du, Dr. Bert N. | Metabolism Study Section | 1967-68 |
| Lacy, Dr. Paul E. | Pathology B Study Section | 1966-67 |
| Landesman, Dr. Sheldon H. | AIDS and Related Research Study Section 2 | 1992-94 |
| Lane, Dr. Joseph M. | Orthopedics and Musculoskeletal Study Section | 1984-86 |
| Langridge, Dr. Robert | Computer and Biomathematical Sciences Study Section | 1976-77 |
| Larsen, Dr. P. Reed | Endocrinology Study Section | 1990-92 |
| Larsh, Dr. John E., Jr. | Tropical Medicine and Parasitology Study Section | 1971-73 |
| Larson, Dr. Thurston E. | Environmental Sciences and Engineering Study Section | 1964-65 |
| Larson, Dr. Thurston E. | Environmental Sciences and Engineering A Study Section | 1965-67 |
| Lasser, Dr. Elliott C. | Radiation Study Section | 1970-71 |
| Laszlo, Dr. John | Pharmacology B Study Section | 1972 |
| Laszlo, Dr. John | Experimental Therapeutics Study Section | 1972-74 |
| Lauer, Dr. Ronald M. | Epidemiology and Disease Control Study Section | 1990-91 |
| Law, Dr. John H. | Physiological Chemistry Study Section | 1970 |
| Lawrence, Dr. H. Sherwood | Allergy and Immunology Study Section | 1963-64 |
| Lawrence, Dr. H. Sherwood | Allergy and Immunology B Study Section | 1964-65 |
| Lawrence, Dr. Merle | Communicative Sciences Study Section | 1967-69 |
| Lazarowitz, Dr. Sondra | Biological Sciences Study Section | 1991-94 |
| Lazzara, Dr. Ralph | Cardiovascular and Renal Study Section | 1985-86 |
| Le Roy, Dr. E. Carwile | General Medicine A Study Section | 1978-80 |
| LeBlanc, Dr. Donald J. | Bacteriology and Mycology II Study Section | 1994-96 |
| Lee, Dr. Ronald D. | Social Sciences and Population Study Section | 1987-89 |
| Lees, Dr. Robert S. | Metabolism Study Section | 1978-80 |
| Lennette, Dr. E. H. | Virus and Rickettsial Study Section | 1951-53 |
| Lennette, Dr. E. H. | Microbiology and Immunology Study Section | 1956 |
| Lennie, Dr. Peter | Visual Sciences B Study Section | 1985-88 |
| Leopold, Dr. Irving R. | Visual Sciences Study Section | 1968-70 |
| Lepow, Dr. Irwin H. | Allergy and Immunology Study Section | 1970-73 |
| Levi, Dr. Dennis M. | Visual Sciences B Study Section | 1988-90 |
| Levine, Dr. Elliott M. | Cell Biology Study Section | 1980-82 |
| Levine, Dr. Michael J. | Oral Biology and Medicine I Study Section | 1990-92 |
| Levine, Dr. Norman D. | Tropical Medicine and Parasitology Study Section | 1966-69 |
| Levinson, Simon R. | Physiology Study Section | 1992-94 |
| Levintow, Dr. Leon | Experimental Virology Study Section | 1976-79 |
| Levy, Dr. Barnet M. | Dental Study Section | 1958-62 |
| Levy, Dr. David M. | Mental Health Study Section | 1950-51 |
| Lewis, Dr. Noland D. C. | Mental Health Study Section | 1948-50 |
| Ley, Dr. Herbert L. | Accident Prevention Research Study Section | 1959-61 |
| Lieberman, Dr. Irving | Cell Biology Study Section | 1970-72 |
| Lieberman, Dr. Seymour | Endocrinology Study Section | 1963-65 |
| Liebeskind, Dr. Lanny S. | Medicinal Chemistry Study Section | 1991-93 |
| Liedtke, Dr. A. James | Cardiovascular and Renal Study Section | 1992-94 |
| Limbird, Dr. Lee E. | Pharmacology Study Section | 1989-91 |
| Lin, Dr. Edmund C. | Microbial Physiology and Genetics A Study Section | 1993-95 |
| Lindenmayer, Dr. George E. | Physiological Sciences Study Section | 1992-94 |
| Lipton, Dr. Morris A. | Psychopharmacology Study Section | 1964-66 |
| Little, Dr. A. Bnan | Reproductive Biology Study Section | 1982-84 |
| Livingston, Dr. David M. | Virology Study Section | 1986-88 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|-------------------------------|------------------------------------------------------|---------|
| Locksley, Dr. Richard M. | Tropical Medicine and Parasitology Study Section | 1991-93 |
| Lodwick, Dr. Gwilym S. | Diagnostic Radiology Study Section | 1980-82 |
| Logan, Dr. Frank A. | Experimental Psychology B Study Section | 1965-66 |
| London, Dr. Irving M. | Metabolism Study Section | 1961-64 |
| London, Dr. William T. | AIDS and Related Research Study Section 2 | 1990-92 |
| Long, Dr. Carole A. | Tropical Medicine and Parasitology Study Section | 1993-95 |
| Longmire, Dr. William P., Jr. | Surgery B Study Section | 1961-65 |
| Longmore, Dr. William J. | Lung Biology and Pathology Study Section | 1991-92 |
| Lonigro, Dr. Andrew J. | Cardiovascular and Renal Study Section | 1991-92 |
| Lough, Dr. John W. | Human Embryology and Development 2 Study Section | 1994-96 |
| Lowenstein, Dr. John M. | Biochemistry Study Section | 1979-80 |
| Lucchini, Dr. John C. | Genetics Study Section | 1986-90 |
| Luck, Dr. David J. I. | Molecular Biology Study Section | 1974-76 |
| Lukas, Dr. Daniel S. | Cardiovascular and Renal Study Section | 1975-77 |
| Lusted, Dr. Lee B. | Computer Research Study Section | 1964 |
| Lusted, Dr. Lee B. | Advisory Committee on Computers in Research | 1960-64 |
| Lynch, Dr. Richard G. | Pathology B Study Section | 1983-86 |
| MacDonald, Dr. A. Bruce | Immunology, Virology and Pathology Study Section | 1990-91 |
| MacLean, Dr. William C., Jr. | Nutrition Study Section | 1985-87 |
| MacMahon, Dr. Brian | Epidemiology and Disease Control Study Section | 1972-73 |
| Magoun, Dr. H. W. | Physiology Study Section | 1952 |
| Magun, Dr. Bruce E. | Biological Sciences Study Section | 1991-93 |
| Mahesh, Dr. Virendra B. | Human Embryology and Development Study Section | 1991-93 |
| Mainardi, Dr. Carlo L. | General Medicine A Study Section | 1988-90 |
| Maisel, Dr. Harry | Visual Sciences A Study Section | 1984-86 |
| Makowski, Dr. Edgar L. | Human Embryology and Development Study Section | 1981-83 |
| Maloney, Dr. James V., Jr. | Surgery A Study Section | 1970 |
| Malvin, Dr. Richard L. | Experimental Cardiovascular Sciences Study Section | 1982-84 |
| Mandel, Dr. Irwin D. | Dental Study Section | 1974-76 |
| Mandy, Dr. William J. | Clinical Sciences Study Section | 1983-85 |
| Maniatis, Dr. Thomas P. | Molecular Biology Study Section | 1982-84 |
| Mansfield, Dr. John M. | Tropical Medicine and Parasitology Study Section | 1985-88 |
| Marban, Dr. Eduardo | Cardiovascular Study Section | 1991-92 |
| Marcus, Dr. Melvin L. | Cardiovascular and Renal Study Section | 1983-85 |
| Marecek, Dr. Jeanne | Social Sciences and Population Study Section | 1985-87 |
| Marks, Dr. Bernard H. | Pharmacology A Study Section | 1972-73 |
| Marquis, Dr. Donald G. | Mental Health Study Section | 1956 |
| Marsh, Dr. Richard E. | Biophysics and Biophysical Chemistry A Study Section | 1970-72 |
| Marshall, Dr. Robert J. | Cardiovascular B Study Section | 1970-71 |
| Martin, Dr. A. Robert | Neurology B Study Section | 1979-81 |
| Martin, Dr. George F. | Neurology B Study Section | 1985-87 |
| Martin, Dr. Kevin J. | General Medicine B Study Section | 1991-93 |
| Martin, Dr. Thomas R. | Lung Biology and Pathology Study Section | 1994-96 |
| Martinez-Carron, Dr. Marino | Biophysics and Biophysical Chemistry B Study Section | 1980-82 |
| Marzluff, Dr. William F. | Molecular Biology Study Section | 1991-93 |
| Mason, Dr. Jay W. | Cardiovascular and Renal Study Section | 1986-88 |
| Mason, Dr. William A. | Experimental Psychology Study Section | 1974-76 |
| Mass, Dr. Werner K. | Microbial Study Section | 1970-72 |
| Massery, Dr. Vincent | Biochemistry Study Section | 1974-76 |
| Mastrangelo, Dr. Michael J. | Experimental Therapeutics Study Section | 1982-84 |
| Mathews, Dr. C. Robert | Molecular and Cellular Biophysics Study Section | 1993-95 |
| Mathews, Dr. Christopher R. | Microbial Physiology Study Section | 1980-81 |
| Mauer, Dr. Alvin M. | Hematology Study Section | 1981-83 |
| Mautner, Dr. Henry G. | Medicinal Chemistry B Study Section | 1971-72 |
| Maxfield, Dr. Fredrick R. | Cellular Biology and Physiology Study Section | 1988-89 |
| Maynert, Dr. Everett W. | Pharmacology A Study Section | 1970-72 |
| McCabe, Dr. William R. | Bacteriology and Mycology Study Section | 1972-73 |
| McCall, Dr. David | Cardiovascular and Pulmonary Study Section | 1983-84 |
| McCann, Dr. Samuel M. | Reproductive Biology Study Section | 1980-82 |
| McCarthy, Dr. Brian J. | Molecular Cytology Study Section | 1976-78 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|----------------------------|------------------------------------------------------------|------------------|
| McCarty, Dr. Maclyn | Allergy and Immunology Study Section | 1959-63 |
| McClay, Dr. David R. | Cellular Biology and Physiology Study Section | 1984-86 |
| McClearn, Dr. Gerald E. | Developmental Behavioral Sciences Study Section | 1975-77 |
| McClure, Dr. William R. | Microbial Physiology and Genetics Study Section | 1988-90 |
| McCormack, Dr. James E. | Arthritis and Metabolic Diseases Program-Project Committee | 1964-66 |
| McCormick, Dr. Bruce H. | Computer and Biomathematical Sciences Study Section | 1973-74 |
| McCormick, Dr. Donald B. | Nutrition Study Section | 1979-81 |
| McDermott, Dr. Walsh | Experimental Therapeutics Study Section | 1949-53 |
| McElroy, Dr. William D. | Physiological Chemistry Study Section | 1959-62, 1964-68 |
| McElroy, Dr. William D. | Biochemistry Study Section | 1958-59 |
| McEwen, Dr. Currier | Arthritis and Metabolic Diseases Program-Project Committee | 1961-64 |
| McGarry, Dr. J. Denis | Metabolism Study Section | 1984-85 |
| McGee, Dr. R. Barclay | Tropical Medicine and Parasitology Study Section | 1970-71 |
| McGee, Dr. Zell A. | Bacteriology and Mycology Study Section | 1979-82 |
| McGiff, Dr. John C. | Cardiovascular and Renal Study Section | 1994-96 |
| McGuigan, Dr. James E. | General Medicine A Study Section | 1976-78 |
| McHugh, Dr. Paul R. | Biopsychology Study Section | 1986-89 |
| McKay, Dr. David B. | Biophysical Chemistry Study Section | 1992-94 |
| McKee, Dr. Jack E. | Sanitary Engineering and Occupational Health Study Section | 1958-60 |
| McKnight, Dr. Steven L. | Molecular Cytology Study Section | 1988-89 |
| McLanahan, Dr. Sara | Social Sciences and Population Study Section | 1993-96 |
| Meinwald, Dr. Jerrold | Medical Chemistry A Study Section | 1966-68 |
| Meister, Dr. Anton | Physiological Chemistry Study Section | 1964-68 |
| Mellman, Dr. Ira S. | Cellular Biology and Physiology I Study Section | 1993-95 |
| Mendelson, Dr. Mortimer L. | Computer and Biomathematical Sciences Study Section | 1970-71 |
| Menken, Dr. Jane | Social Sciences and Population Study Section | 1980-82 |
| Menyuk, Dr. Paula | Communicative Sciences Study Section | 1979-81 |
| Menzel, Dr. Daniel B. | Toxicology Study Section | 1980-81 |
| Menzer, Dr. Robert E. | Toxicology Study Section | 1973-75 |
| Merending, Dr. K. Alvin | Surgery A Study Section | 1970-72 |
| Merrick, Dr. William C. | Physiological Chemistry Study Section | 1990-92 |
| Merzenich, Dr. Michael M. | Sensory Disorders and Language Study Section | 1987-88 |
| Meyer, Dr. Karl F. | Primate Research Study Section | 1958-63 |
| Miller, Dr. Elizabeth C. | Pharmacology B Study Section | 1971-72 |
| Miller, Dr. Orlando J. | Human Embryology and Development Study Section | 1972-74 |
| Miller, Dr. Ronald D. | Surgery, Anesthesiology and Trauma Study Section | 1989-90 |
| Miner, Dr. John A. | Nutrition Study Section | 1987-89 |
| Mitchell, Dr. Jerry R. | Pharmacology Study Section | 1987-89 |
| Mitscher, Dr. Lester A. | Bio-Organic and Natural Products Chemistry Study Section | 1981-83 |
| Mizel, Dr. Steven B. | Allergy and Immunology Study Section | 1991-93 |
| Miziorko, Dr. Henry M. | Medical Biochemistry Study Section | 1994-96 |
| Moghissi, Dr. Kamran S. | Reproductive Endocrinology Study Section | 1986-88 |
| Molnar, Dr. Charles E. | Computer and Biomathematical Sciences Study Section | 1974-75 |
| Monroe, Dr. Hamish N. | Nutrition Study Section | 1968-70 |
| Montelaro, Dr. Ronald C. | AIDS and Related Research Study Section 1 | 1992-94 |
| Moody, Dr. Frank G. | Surgery and Bioengineering Study Section | 1978-80 |
| Moore, Dr. Alton W. | Dental Study Section | 1971-74 |
| Moore, Dr. Carl V. | Hematology Study Section | 1952-55 |
| Moore, Dr. Francis D. | Surgery Study Section | 1956-59 |
| Moore, Dr. J. E. | Syphilis Study Section | 1946-49 |
| Moore, Mr. Felix E. | Committee on Standards for Grants Surveys | 1952-54 |
| Morgane, Dr. Peter J. | Neurology B Study Section | 1976-78 |
| Moritz, Dr. Alan | Pathology Study Section | 1952-54 |
| Morris, Dr. Alvin L. | Dental Study Section | 1965-67 |
| Morris, Dr. David B. | Biochemistry Study Section | 1985-86 |
| Morison, Dr. Alan S. | Epidemiology and Disease Control Study Section | 1986-88 |
| Moses, Dr. Harold L. | Chemical Pathology Study Section | 1983-86 |
| Mosig, Dr. Gisela | Microbial Chemistry Study Section | 1978-81 |
| Mouricastle, Dr. Vernon B. | Physiology Study Section | 1958-61 |
| Mow, Dr. Van Chao-Shen | Orthopedics and Musculoskeletal Study Section | 1982-84 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|-----------------------------|--------------------------------------------------------|---------|
| Mulcahy, Dr. R. Timothy | Experimental Therapeutics I Study Section | 1993-95 |
| Muldoon, Dr. Thomas G. | Biochemical Endocrinology Study Section | 1983-86 |
| Mulholland, Dr. John H. | Surgery Study Section | 1953-56 |
| Muller, Dr. William H., Jr. | Surgery A Study Section | 1964-68 |
| Munson, Dr. Paul | General Medicine B Study Section | 1970 |
| Murphy, Dr. Sheldon D. | Toxicology Study Study Section | 1972-73 |
| Murphy, Dr. Timothy F. | Bacteriology and Mycology II Study Section | 1992-94 |
| Murray, Dr. David G. | Orthopedics and Musculoskeletal Study Section | 1988-89 |
| Myers, Dr. Jack D. | General Medicine Study Section | 1963-64 |
| Myrvik, Dr. Quentin N. | Bacteriology and Mycology Study Section | 1970-71 |
| Nahm, Dr. Helen | Nursing Research Study Section | 1957-59 |
| Najjar, Dr. Victor A. | Bacteriology and Mycology B Study Section | 1964-67 |
| Nalbandov, Dr. Andrew V. | Reproductive Biology Study Section | 1970-72 |
| Nance, Dr. Walter E. | Mammalian Genetics Study Section | 1990-92 |
| Neal, Dr. Robert A. | Toxicology Study Section | 1975-76 |
| Nepom, Dr. Gerald T. | Immunological Sciences Study Section | 1994-96 |
| Nesheim, Dr. Malden C. | Nutrition Study Section | 1984-85 |
| Neter, Dr. Erwin | Biomedical Communications Study Section | 1972-73 |
| Newman, Dr. Elliott V. | Heart Program Project Committee | 1961-64 |
| Newsome, Dr. David A. | Visual Sciences A Study Section | 1988-89 |
| Nickles, Dr. William J. | Neurological Sciences Study Section | 1990-91 |
| Niden, Dr. Albert H. | Cardiovascular and Pulmonary Research B Study Section | 1971-72 |
| Niels, Dr. Alan | Pharmacology Study Section | 1983-85 |
| Nielson, Dr. Eric G. | Pathology A Study Section | 1990-92 |
| Nikiforuk, Dr. Gordon | Dental Study Section | 1968-70 |
| Nisonoff, Dr. Alfred | Allergy and Immunology Study Section | 1984-87 |
| Noland, Dr. Stanton P. | Surgery and Bioengineering Study Section | 1985-87 |
| Norback, Dr. Jane S. | Nursing Research Study Section | 1991-93 |
| Norgard, Dr. Michael V. | Bacteriology and Mycology I Study Section | 1993-94 |
| Norton, Dr. Edward W. D. | Visual Sciences Study Section | 1963-67 |
| Norton, Dr. William T. | Behavioral and Neurosciences Study Section | 1981-84 |
| Nowakowski, Dr. Richard | Neurology B I Study Section | 1993-95 |
| O'Callaghan, Dr. Dennis | Immunology, Virology, Pathology Study Section | 1993-95 |
| O'Fallon, Dr. William M. | Epidemiology and Disease Control 1 Study Section | 1993-95 |
| O'Malley, Dr. Bert W. | Endocrinology Study Section | 1973-74 |
| O'Rourke, Dr. Robert A. | Cardiovascular and Pulmonary Study Section | 1981-83 |
| Odell, Dr. Gerald B. | General Medicine A Study Section | 1974-76 |
| Oh, Dr. Tae H. | Neurology B Study Section | 1991-93 |
| Oh, Dr. William | Human Embryology and Development Study Section | 1985-88 |
| Olefsky, Dr. Jerrold M. | Metabolism Study Section | 1981-84 |
| Oliver, Dr. Clarence P. | Morphology and Genetics Study Section | 1955-58 |
| Olness, Dr. Karen | AIDS and Related Research Study Section 7 | 1994-96 |
| Olson, Dr. Wilma K. | Molecular and Cellular Biophysics Study Section | 1984-87 |
| Olsson, Dr. Ray A. | Cardiovascular and Pulmonary Study Section | 1979-81 |
| Organisciak, Dr. Daniel T. | Visual Sciences A Study Section | 1989-90 |
| Orthel, Dr. Thomas C. | Tropical Medicine and Parasitology Study Section | 1975-77 |
| Osborn, Dr. John J. | Cardiovascular B Study Section | 1967-69 |
| Oster-Granite, Dr. Mary L. | Human Embryology and Development 2 Study Section | 1993-94 |
| Owen, Dr. Ray D. | Allergy and Immunology B Study Section | 1967 |
| Owen, Dr. Ray D. | Genetics Study Section | 1961-64 |
| Owen, Dr. Ray D. | Immunobiology Study Section | 1967-70 |
| Owens, Dr. Gary K. | Cellular Biology and Physiology II Study Section | 1993-95 |
| Ozer, Dr. Howard | Experimental Therapeutics Study Section | 1988-89 |
| Paffenbarger, Dr. George | Dental Study Section | 1949-50 |
| Palade, Dr. George E. | Molecular Biology Study Section | 1971-72 |
| Palay, Dr. Sanford L. | Behavioral and Neurosciences Study Section | 1984-86 |
| Palmer, Dr. Edward D. | Environmental Sciences and Engineering B Study Section | 1965-67 |
| Pan, Dr. Hung Y. | Clinical Sciences Study Section | 1985-87 |
| Paquette, Dr. Leo A. | Medicinal Chemistry Study Section | 1986-89 |
| Park, Dr. James T. | Microbial Physiology and Genetics Study Section | 1985-88 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|------------------------------|------------------------------------------------------------|------------------|
| Parker, Dr. C. Richard, Jr. | Reproductive Endocrinology Study Section | 1988-90 |
| Parker, Dr. Robert G. | Radiation Study Section | 1975-77 |
| Parsons, Dr. J. Thomas | Experimental Virology Study Section | 1992-94 |
| Patt, Dr. Harvey M. | Radiation Study Section | 1959-62 |
| Patton, Dr. Harry D. | Physiology Study Section | 1965-66 |
| Patton, Dr. Robert A. | Psychopharmacology Study Section | 1963-64 |
| Paul, Dr. John R. | Virus and Rickettsial Study Section | 1946-51 |
| Peck, Dr. William A. | General Medicine B Study Section | 1979-81 |
| Pegg, Dr. Anthony E. | Pathobiological Chemistry Study Section | 1979-81 |
| Penderson, Dr. Peter L. | Physical Biochemistry Study Section | 1986-87 |
| Perlin, Dr. Seymour | Mental Health B Study Section | 1964-66 |
| Perlmutter, Dr. Marion | Human Development and Aging Study Section | 1984-85 |
| Perry, Dr. George | Neurological Sciences Study Section | 1991-93 |
| Pesch, Dr. Leroy A. | General Medicine A Study Section | 1970 |
| Peters, Dr. Alan | Neurology B Study Section | 1978-79 |
| Peterson Dr. Ralph E. | General Medicine B Study Section | 1971-72 |
| Peterson, Dr. Donald R. | Epidemiology and Disease Control Study Section | 1978-79 |
| Pfenniger, Dr. Karl H. | Neurology C Study Section | 1992-94 |
| Phillips, Dr. M. Ian | Experimental Cardiovascular Sciences Study Section | 1992-94 |
| Phillips, Dr. Ralph W. | Dental Study Section | 1962-65 |
| Pierce, Dr. G. Barry | Pathology B Study Section | 1976-77 |
| Pierce, Dr. John G. | Biochemical Endocrinology Study Section | 1981-85 |
| Pierce, Dr. William S. | Surgery and Bioengineering Study Section | 1987-89 |
| Pietra, Dr. Giuseppe G. | Pathology A Study Section | 1984-86 |
| Pillon, Dr. Dennis J. | Biomedical Sciences Study Section | 1991-93 |
| Pincus, Dr. Gregory | Endocrinology Study Section | 1955-57 |
| Plaa, Dr. Gabriel L. | Toxicology Study Section | 1967-69 |
| Platt, Dr. Richard | Epidemiology and Disease Control 2 Study Section | 1994-96 |
| Pleasure, Dr. David E. | Neurology B Study Section | 1989-91 |
| Pollack, Dr. George D. | Hearing Research Study Section | 1989-91 |
| Pollard, Dr. Thomas D. | Molecular Cytology Study Section | 1986-88 |
| Porter, Dr. John R. | Biomedical Communications Study Section | 1967-69 |
| Potter, Dr. Lincoln T. | Neurological Sciences Study Section | 1985-88 |
| Pounds, Dr. Joel G. | Toxicology Study Section | 1991-93 |
| Powers, Dr. Samuel R. | Surgery B Study Section | 1974-76 |
| Prehn, Dr. Richmond T. | Immunobiology Study Section | 1977-79 |
| Prendergast, Dr. Franklyn G. | Biophysical Chemistry Study Section | 1986-88 |
| Price, Dr. Donald L. | Neurology A Study Section | 1982-83 |
| Puett, Dr. J. David | Biochemical Endocrinology Study Section | 1991-93 |
| Purpura, Dr. Dominick P. | Neurology Study Section | 1975-77 |
| Rabins, Dr. Peter V. | Human Development and Aging II Study Section | 1992-94 |
| Racker, Dr. Efraim | Biochemistry Study Section | 1959-61, 1967-71 |
| Rackley, Dr. Charles E. | Cardiovascular and Renal Study Section | 1977-79 |
| Raffel, Dr. Sidney | Allergy and Immunology Study Section | 1956-59 |
| Ragan, Dr. Charles E. | Metabolism and Nutrition Study Section | 1953-55 |
| Raisz, Dr. Lawrence G. | General Medicine B | 1977-79 |
| Rapaport, Dr. Samuel I. | Hematology Study Section | 1987-88 |
| Rapp, Dr. Fred | Clinical Sciences Study Section | 1982-83 |
| Rappaport, Dr. Felix T. | Arthritis and Metabolic Diseases Program-Project Committee | 1971-72 |
| Rasey, Dr. Janet S. | Radiation Study Section | 1982-84 |
| Ratner, Dr. Lee | AIDS and Related Research Study Section 3 | 1994-96 |
| Ratnoff, Dr. Oscar D. | Hematology Study Section | 1977-79 |
| Read, Dr. Clark P. | Tropical Medicine and Parasitology Study Section | 1961-65 |
| Reader, Dr. George G. | Human Ecology Study Section | 1961-64 |
| Recant, Dr. Lillian | Metabolism Study Section | 1966-67 |
| Recker, Dr. Robert R. | Orthopedics and Musculoskeletal Study Section | 1986-88 |
| Rector, Dr. Floyd C., Jr. | Cardiovascular B Study Section | 1970 |
| Reddy, Dr. Janardan K. | Clinical Sciences Study Section | 1990-91 |
| Reed, Dr. George H. | Biochemistry Study Section | 1993-95 |
| Reed, Dr. Lowell J. | Public Health Study Section | 1946-50 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|------------------------------|------------------------------------------------------------|---------|
| Reier, Dr. Paul J. | Neurology B Study Section | 1983-85 |
| Reisfeld, Dr. Ralph A. | Experimental Immunology Study Section | 1981-83 |
| Reynolds, Dr. Ernest W., Jr. | Cardiovascular and Pulmonary Research A Study Section | 1972-73 |
| Rich, Dr. Clayton | General Medicine B Study Section | 1972-73 |
| Rich, Dr. Daniel H. | Bio-Organic and Natural Products Chemistry Study Section | 1983-85 |
| Rickenberg, Dr. Howard V. | Microbial Chemistry Study Section | 1972-73 |
| Rifkind, Dr. Arleen | Toxicology Study Section | 1991-93 |
| Riley, Dr. Monica | Microbial Chemistry Study Section | 1976-77 |
| Riordan, Dr. James F. | Bioanalytical and Metallobiochemistry Study Section | 1979-80 |
| Riordan, Dr. James F. | Metallobiochemistry Study Section | 1980-82 |
| Robbins, Dr. Lewis | Mental Health A Study Section | 1962-64 |
| Robbins, Dr. Phillips W. | Pathobiochemistry Study Section | 1982-84 |
| Roberts, Dr. Harold R. | Hematology Study Section | 1988-91 |
| Robertson, Dr. Fredika M. | Chemical Pathology Study Section | 1994-96 |
| Robinovitch, Dr. Murry R. | Oral Biology and Medicine Study Section | 1978-80 |
| Robinson, Dr. Carlton | Accident Prevention Research Study Section | 1967 |
| Robinson, Dr. William S. | Experimental Virology Study Section | 1981-83 |
| Roden, Dr. Dan M. | Cardiovascular Study Section | 1994-96 |
| Roeder, Dr. Glenna S. | Biological Sciences Study Section | 1990-91 |
| Rogers, Dr. Edward S. | Human Ecology Study Section | 1960-61 |
| Rogers, Dr. Edward S. | Public Health Research Study Section | 1958-60 |
| Rogers, Dr. Kenneth D. | Epidemiology and Disease Control Study Section | 1965-68 |
| Rogers, Dr. Kenneth D. | Disease Control Study Section | 1964-65 |
| Rohlich, Dr. Gerald A. | Environmental Sciences and Engineering Study Section | 1960-64 |
| Romano, Dr. John U. | Mental Health Study Section | 1946-47 |
| Rose, Dr. Harry M. | Virology and Rickettsiology Study Section | 1964-67 |
| Rose, Dr. Richard J. | Human Development and Aging Study Section | 1981-84 |
| Rosenfeld, Dr. Ron | Endocrinology Study Section | 1992-94 |
| Ross, Dr. Richard S. | Cardiovascular A Study Section | 1966-69 |
| Rosse, Dr. Wendell P. | Hematology Study Section | 1985-87 |
| Rossi, Dr. Harald H. | Radiation Study Section | 1965-67 |
| Rothfield, Dr. Lawrence I. | Microbial Physiology and Genetics Study Section | 1991-93 |
| Rothman-Denes, Dr. Lucia | Microbial Physiology and Genetics A Study Section | 1994-96 |
| Rottman, Dr. Fritz M. | Biochemistry Study Section | 1980-82 |
| Rourke, Dr. Anthony J. J. | Hospital Facilities Research Study Section | 1955-58 |
| Rouse, Dr. Barry T. | AIDS and Related Research Study Section 3 | 1990-92 |
| Roush, Dr. William R. | Medicinal Chemistry Study Section | 1993-95 |
| Routh, Dr. Donald K. | Behavioral Medicine Study Section | 1983-85 |
| Rubin, Dr. Walter | General Medicine A Study Section | 1982-85 |
| Ruddle, Dr. Francis H. | Genome Study Section | 1991-93 |
| Ruddle, Dr. Nancy H. | Allergy and Immunology Study Section | 1993-95 |
| Ruddy, Dr. Shaun | Allergy and Immunology Study Section | 1978-81 |
| Rudel, Dr. Lawrence L. | Metabolism Study Section | 1988-90 |
| Ruh, Dr. Mary F. | Reproductive Endocrinology Study System | 1990-92 |
| Rundles, Dr. R. Wayne | Pharmacology and Experimental Therapeutics B Study Section | 1967-68 |
| Russell, Dr. Paul F. | Tropical Medicine and Parasitology Study Section | 1949-50 |
| Russell, Dr. Paul F. | Malaria Study Section | 1947-49 |
| Russell, Dr. Paul S. | Allergy and Immunology B Study Section | 1965-67 |
| Ryan, Dr. Robert J. | Reproductive Biology Study Section | 1972-73 |
| Ryan, Dr. Una S. | Pathology A Study Section | 1989-90 |
| Sabatini, Dr. David D. | Molecular Biology Study Section | 1976-77 |
| Sabiston, Dr. David C., Jr. | Surgery B Study Section | 1970-72 |
| Sahs, Dr. Adolph L. | Neurology A Study Section | 1963-66 |
| Salhanick, Dr. Hilton A. | Endocrinology Study Section | 1965-66 |
| Salton, Dr. Milton R. J. | Microbial Chemistry Study Section | 1975-76 |
| Samarel, Dr. Allen M. | Clinical Sciences Study Section | 1991-94 |
| Sanazaro, Dr. Paul J. | Health Services Research Study Section | 1966-67 |
| Saslaw, Dr. Samuel | Allergy and Infectious Diseases Program-Project Committee | 1961-65 |
| Saslow, Dr. George | Mental Health Study Section | 1957-58 |
| Saunders, Dr. John B. deC. | History of Life Sciences Study Section | 1963-64 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|---------------------------------|------------------------------------------------------------|---------|
| Saz, Dr. Howard J. | Tropical Medicine and Parasitology Study Section | 1970 |
| Scanlon, Dr. John E. | Tropical Medicine and Parasitology Study Section | 1973-75 |
| Scanu, Dr. Angelo M. | Biophysics and Biophysical Chemistry Study Section | 1978-80 |
| Schacter, Dr. Moselio | Bacteriology and Mycology Study Section | 1978-79 |
| Schadler, Dr. Russell W. | Bacteriology and Mycology Study Section | 1973-74 |
| Schaie, Dr. K. Warner | Human Development and Aging Study Section | 1983-84 |
| Schaie, Dr. K. Warner | Developmental Behavioral Sciences Study Section | 1972-74 |
| Schedl, Dr. Paul | Genetics Study Section | 1993-95 |
| Schelbert, Dr. Heinrich R. | Cardiovascular and Pulmonary Study Section | 1986-87 |
| Schenk, Dr. Worthington G., Jr. | Surgery and Bioengineering Study Section | 1982-84 |
| Schenkein, Dr. Harvey A. | Oral Biology and Medicine Study Section | 1990-92 |
| Schieken, Dr. Richard M. | Epidemiology and Disease Control Study Section | 1985-87 |
| Schimke, Dr. Robert T. | Molecular Biology Study Section | 1972-74 |
| Schlesinger, Dr. R. Walter | Virology and Rickettsiology Study Section | 1968-69 |
| Schlesinger, Dr. Sondra | Experimental Virology Study Section | 1994-96 |
| Schmickel, Dr. Roy D. | Mammalian Genetics Study Section | 1981-82 |
| Schmidt, Dr. Carl F. | Pharmacology Study Section | 1946-51 |
| Schmidt, Dr. L. H. | Cancer Chemotherapy Study Section | 1956-59 |
| Schmidt, Dr. L. H. | Pharmacology and Experimental Therapeutics Study Section | 1955-56 |
| Schmitt, Dr. Francis O. | Biophysics and Biophysical Chemistry Study Section | 1955-58 |
| Schnaar, Dr. Ronald L. | Physiological Chemistry Study Section | 1992-94 |
| Schoenfeld, Dr. William N. | Experimental Psychology Study Section | 1964 |
| Schoenfeld, Dr. William N. | Experimental Psychology A Study Section | 1964-66 |
| Schooley, Dr. Robert T. | AIDS and Related Research Study Section 1 | 1990-92 |
| Schull, Dr. William J. | Genetics Study Section | 1970-72 |
| Schultz, Dr. Andrew, Jr. | Accident Prevention Research Study Section | 1964-67 |
| Schumaker, Dr. Verne N. | Biophysics and Biophysical Chemistry A Study Section | 1974-77 |
| Schuman, Dr. Jerome L. | Developmental Behavioral Sciences Study Section | 1968-72 |
| Schwartz, Dr. Benjamin | Allergy and Immunology Study Section | 1987-89 |
| Schwartz, Dr. Lawrence B. | Immunological Sciences Study Section | 1992-94 |
| Schwartz, Dr. William B. | General Medicine B Study Section | 1965-69 |
| Sclabassi, Dr. Robert J. | AIDS and Related Research Study Section 7 | 1990-92 |
| Scott, Dr. W. W. | Cancer Chemotherapy Study Section | 1960-63 |
| Scott, Dr. William H., Jr. | Surgery B Study Section | 1966-70 |
| Secrest, Dr. John A., III | AIDS and Related Research Study Section 4 | 1990-92 |
| Seger, Dr. Gordon H. | General Clinical Research Center Committee | 1961-65 |
| Selfridge, Dr. Oliver C. | Computer and Biomathematical Sciences Study Section | 1971-72 |
| Seligman, Dr. Arnold M. | Pharmacology and Experimental Therapeutics B Study Section | 1965-67 |
| Selvester, Dr. Ronald H. | Cardiovascular and Pulmonary Research B Study Section | 1972-73 |
| Senior, Dr. Alan E. | Physical Biochemistry Study Section | 1987-89 |
| Severinghaus, Dr. John W. | Cardiovascular B Study Section | 1965-67 |
| Sewell, Dr. William H. | Behavioral Sciences Study Section | 1959-61 |
| Shaffer, Dr. Morris F. | Microbiology Study Section | 1956-58 |
| Shaffer, Dr. Morris F. | Microbiology and Immunology Study Section | 1955-56 |
| Shank, Dr. Robert E. | Nutrition Study Section | 1966-68 |
| Shannon, Dr. James A. | Malaria Study Section | 1946-47 |
| Shapiro, Dr. Irving M. | Oral Biology and Medicine Study Section | 1986-89 |
| Shapley, Dr. Robert M. | Visual Sciences B Study Section | 1990-92 |
| Sharp, Dr. Philip A. | Virology Study Section | 1984-86 |
| Shenk, Dr. Thomas E. | Virology Study Section | 1990-92 |
| Sheps, Dr. Cecil G. | Hospital Facilities Research Study Section | 1958-60 |
| Sheps, Dr. Cecil G. | Health Services Research Study Section | 1960-62 |
| Sherman, Dr. S. Murray | Behavioral and Neurosciences Study Section | 1991-93 |
| Sherman, Dr. Steven J. | Bio-Organic and Natural Products Chemistry Study Section | 1985-86 |
| Sherman, Dr. Steven J. | Behavioral Medicine Study Section | 1986-88 |
| Sheridan, Dr. Fredenck E. | Pharmacology and Experimental Therapeutics Study Section | 1963-65 |
| Shipley, Dr. G. Graham | Biophysical Chemistry Study Section | 1990-92 |
| Shires, Dr. G. Thomas | Surgery A Study Section | 1976-78 |
| Shive, Dr. William | Nutrition Study Section | 1972-73 |
| Shuster, Dr. Jonathan J. | Epidemiology and Disease Control Study Section | 1989-90 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|---------------------------|------------------------------------------------------|---------|
| Siaga, Dr. Thomas J. | Chemical Pathology Study Section | 1979-82 |
| Siditis, Dr. John J. | AIDS and Related Research Study Section 7 | 1992-94 |
| Sidman, Dr. Murry | Developmental Behavioral Sciences Study Section | 1977-78 |
| Sitieri, Dr. Pentti K. | Endocrinology Study Section | 1975-77 |
| Silinsky, Dr. Eugene M. | Neurological Sciences Study Section | 1988-90 |
| Simms, Dr. Henry S. | Gerontology Study Section | 1948-49 |
| Sinclair, Dr. Warren K. | Radiation Study Section | 1968-70 |
| Singer, Dr. Jerome E. | Population Research Study Section | 1972-74 |
| Siskind, Dr. Gregory W. | Allergy and Immunology Study Section | 1973-75 |
| Skalko, Dr. Richard G. | Human Embryology and Development 2 Study Section | 1993-94 |
| Skorton, Dr. David J. | International and Cooperative Projects Study Section | 1990-92 |
| Slaga, Dr. Thomas J. | Chemical Pathology Study Section | 1980-82 |
| Slavkin, Dr. Harold C. | Oral Biology and Medicine Study Section | 1982-85 |
| Smathers, Dr. James B. | Radiation Study Section | 1984-86 |
| Smith, Dr. Arnold L. | Bacteriology and Mycology Study Section | 1991-92 |
| Smith, Dr. J. Graham, Jr. | General Medicine A Study Section | 1968-69 |
| Smith, Dr. John R. | Cardiovascular Study Section | 1963-64 |
| Smith, Dr. John R. | Cardiovascular A Study Section | 1964-66 |
| Smith, Dr. L. Dennis | Cell Biology Study Section | 1977-79 |
| Smith, Dr. Peter G. | Neurology B Study Section | 1993-95 |
| Smith, Dr. Ronald E. | Visual Sciences A Study Section | 1986-87 |
| Snell, Dr. Esmond E. | Physiological Chemistry Study Section | 1958-59 |
| Snider, Dr. Ray S. | Committee on Radiation Studies | 1953-55 |
| Snider, Dr. Ray S. | Neurology Study Section | 1959-63 |
| Snyder, Dr. Benson R. | Behavioral Sciences Study Section | 1964-67 |
| Snyder, Dr. Ray S. | Neurology B Study Section | 1963-66 |
| Snyder, Dr. Robert | Toxicology Study Section | 1979-80 |
| Sobin, Dr. Sidney S. | Experimental Cardiovascular Sciences Study Section | 1981-82 |
| Sokatch, Dr. John R. | Microbial Physiology Study Section | 1981-83 |
| Solaro, Dr. R. John | Experimental Cardiovascular Sciences Study | 1990-92 |
| Soldo, Dr. Beth J. | Human Development and Aging Study Section | 1987-88 |
| Solomon, Dr. Frank E. | Cellular Biology and Physiology Study Section | 1986-88 |
| Sonenberg, Dr. Martin | Endocrinology Study Section | 1985-87 |
| Sparks, Dr. David I. | Biopsychology Study Section | 1985-86 |
| Sparting, Dr. Philip F. | Bacteriology and Mycology Study Section | 1982-84 |
| Spear, Dr. Peter D. | Visual Sciences B Study Section | 1982-83 |
| Spector, Dr. Abraham | Visual Sciences A Study Section | 1979-80 |
| Sperry, Dr. Roger W. | Experimental Psychology Study Section | 1970 |
| Spiker, Dr. Charles C. | Developmental Behavioral Sciences Study Section | 1967-71 |
| Spitznagel, Dr. John K. | Bacteriology and Mycology Study Section | 1976-78 |
| Spudich, Dr. James A. | Molecular Cytology Study Section | 1991-94 |
| Sreebny, Dr. Leo M. | Dental Study Section | 1967-68 |
| Stanton, Dr. Alfred H. | Mental Health Study Section | 1960-61 |
| Stanton, Dr. Alfred H. | Experimental Psychology Study Section | 1959-60 |
| Staubert, Dr. Leslie A. | Tropical Medicine and Parasitology Study Section | 1956-59 |
| Stein, Dr. Janet L. | Physiological Chemistry Study Section | 1988-90 |
| Stellar, Dr. Eliot | Experimental Psychology Study Section | 1960-62 |
| Stellwagen, Dr. Earle C. | Biophysics and Biophysical Chemistry B Study Section | 1972-74 |
| Sterling, Dr. Charles R. | AIDS and Related Research Study Section 5 | 1994-96 |
| Stern, Dr. Herbert | Cell Biology Study Section | 1967-70 |
| Stevens, Dr. Kenneth N. | Communicative Sciences Study Section | 1971-72 |
| Stevenson, Dr. Lloyd G. | History of Life Sciences Study Section | 1967-68 |
| Stiles, Dr. Joan | Human Development and Aging III Study Section | 1994-96 |
| Stillman, Dr. Bruce W. | Experimental Virology Study Section | 1988-90 |
| Stewart, Dr. William S. | Respiratory and Applied Physiology Study Section | 1993-95 |
| Stitzel, Dr. Robert E. | Neurological Sciences Study Section | 1983-85 |
| Stokes, Dr. Joseph, III | Epidemiology and Disease Control Study Section | 1975-78 |
| Storer, Dr. John B. | Radiation Study Section | 1972-75 |
| Stork, Dr. Gilbert | Medicinal Chemistry Study Section | 1968-71 |
| Stowell, Dr. Robert E. | Pathology Study Section | 1954-57 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|-----------------------------|------------------------------------------------------------|---------|
| Strauss, Dr. Arnold W. | Cardiovascular Study Section | 1992-94 |
| Strittmatter, Dr. Warren J. | Neurology B Study Section | 1987-89 |
| Strong, Dr. Jack P. | Pathology A Study Section | 1967-69 |
| Stulman, Dr. Osias | Immunobiology Study Section | 1980-81 |
| Suchy, Dr. Frederick J. | General Medicine A Study Section | 1991-93 |
| Suki, Dr. Wadi N. | General Medicine B Study Section | 1983-85 |
| Sutin, Dr. Jerome | Neurology A Study Section | 1974-75 |
| Swan, Dr. Kenneth C. | Visual Sciences Study Section | 1962-63 |
| Swan, Dr. Kenneth C. | Sensory Diseases Study Section | 1959-62 |
| Swanson, Dr. Carl P. | Cell Biology Study Section | 1964-65 |
| Swisher, Dr. Scott N. | Hematology Study Section | 1970 |
| Switzer, Dr. Robert L. | Biochemistry Study Section | 1987-89 |
| Sylvester, Dr. Jimmie T. | Respiratory and Applied Physiology Study Section | 1987-89 |
| Taber, Dr. Harry W. | Biomedical Sciences Study Section | 1983-88 |
| Tager, Dr. Ira B. | Epidemiology and Disease Control Study Section | 1988-90 |
| Talbot, Dr. Nathan B. | Metabolism Study Section | 1963-64 |
| Tanzer, Dr. Marvin L. | Pathobiochemistry Study Section | 1988-90 |
| Tarbel, Dr. D. Stanley | Medical Chemistry B Study Section | 1965-68 |
| Tatum, Dr. Edward L. | Genetics Study Section | 1964-66 |
| Taylor, Dr. John M. | Physiological Chemistry Study Section | 1982-83 |
| Taylor, Dr. Robert E. | Toxicology Study Section | 1989-91 |
| Teller, Davida Y. | Visual Sciences B Study Section | 1983-85 |
| Tenney, Dr. Stephen M. | Physiology Study Section | 1962-65 |
| Tephley, Dr. Thomas R. | Pharmacology Study Section | 1991-93 |
| Tew, Dr. Kenneth D. | Experimental Therapeutics I Study Section | 1990-93 |
| Thoft, Dr. Richard A. | Visual Sciences A Study Section | 1989-92 |
| Thomas, Dr. George J., Jr. | Biophysical Chemistry Study Section | 1982-83 |
| Thygeson, Dr. Phillips | Sensory Diseases Study Section | 1954-59 |
| Tilgham, Dr. Shirley M. | Molecular Biology Study Section | 1986-87 |
| Tipton, Dr. Charles M. | Applied Physiology and Bioengineering Study Section | 1973-76 |
| Tollin, Dr. Gordon | Biophysics and Biophysical Chemistry A Study Section | 1972-74 |
| Tove, Dr. Samuel | Metabolic Pathology Study Section | 1987-89 |
| Trainor, Dr. Diane A. | Bio-Organic and Natural Products Chemistry Study Section | 1991-93 |
| Traylor, Dr. Teddy G. | Metallobiochemistry Study Section | 1983-86 |
| Treloar, Dr. Alan E. | Public Health Research Study Section | 1957-58 |
| Treloar, Dr. Alan E. | Public Health and Nursing Study Section | 1955-57 |
| Trost, Dr. Barry M. | Medicinal Chemistry Study Section | 1984-86 |
| Trufant, Dr. Samuel A. | Neurology Program-Project Committee | 1961-64 |
| Trumpower, Dr. Bernard L. | Physical Biochemistry Study Section | 1981-83 |
| Tschudin, Dr. Mary S. | Nursing Research Study Section | 1964-67 |
| Tso, Dr. Patrick P. | General Medicine A Study Section | 1987-91 |
| Tuan, Dr. Rocky S. | Oral Biology and Medicine II Study Section | 1992-94 |
| Turner, Dr. Ralph H. | Behavioral Sciences Study Section | 1963-64 |
| Turner, Dr. Thomas B. | Microbiology and Immunology Study Section | 1952-54 |
| Tykocinski, Dr. Mark L. | Pathology B Study Section | 1994-96 |
| Tyler, Dr. Frank H. | General Medicine Study Section | 1961-63 |
| Uitto, Dr. Jouni J. | General Medicine A Study Section | 1986-88 |
| Urich, Dr. John A. | Bacteriology and Mycology Study Section | 1960-64 |
| Uzman, Dr. Betty G. | Pathology A Study Section | 1973-76 |
| Valenstein, Dr. Elliot S. | Experimental Psychology A Study Section | 1966-67 |
| Valle, Dr. David L. | Mammalian Genetics Study Section | 1988-90 |
| Van Eldik, Dr. Linda J. | Neurological Sciences I Study Section | 1993-95 |
| Vander Leen, Dr. Willard P. | Endocrinology Study Section | 1974-75 |
| Vaughan, Dr. Harry F. | Public Health & Sanitation Study Section | 1955 |
| Vaughan, Dr. Harry F. | Sanitary Engineering and Occupational Health Study Section | 1955-58 |
| Veveys, Dr. Edwin | Medicinal Biochemistry Study Section | 1990-91 |
| Vick, Dr. Nicholas A. | Pathology A Study Section | 1982-84 |
| Villapranca, Dr. Joseph J. | Biochemistry Study Section | 1985-86 |
| Vitler, Dr. Richard W. | Hematology Study Section | 1965-69 |
| Volle, Dr. Robert L. | Neurological Sciences Study Section | 1979-81 |

Appendix F (continued)

| Chair | Study Section Name | Term |
|-----------------------------|--------------------------------------------------------------|---------|
| Volle, Dr. Robert L. | Pharmacology Study Section | 1973-75 |
| Volpe, Dr. Bruce E. | Sensory Disorders and Language Study Section | 1991-93 |
| Vonderahe, Dr. A. R. | Neurology Study Section | 1956-59 |
| Wagner, Dr. Peter D. | Respiratory and Applied Physiology Study Section | 1985-87 |
| Wallace, Dr. Craig K. | Bacteriology and Mycology Study Section | 1971-72 |
| Walsh, Dr. Arnold D. | Pharmacology and Experimental Therapeutics B Study Section | 1963-65 |
| Walsh, Dr. Christopher T. | Biochemistry Study Section | 1981-82 |
| Walsh, Dr. Kenneth A. | Physiological Chemistry Study Section | 1980-82 |
| Walsh, Dr. Richard A. | Cardiovascular and Renal Study Section | 1990-91 |
| Walsh, Dr. Theodore E. | Communicative Sciences Study Section | 1962-66 |
| Wang, Dr. James C. | Molecular Biology Study Section | 1990-91 |
| Wangensteen, Dr. Owen H. | Surgery Study Section | 1952-53 |
| Wara, Dr. Diane W. | Immunological Sciences Study Section | 1987-89 |
| Ward, Dr. Darrell N. | Biochemical Endocrinology Study Section | 1979-81 |
| Ward, Dr. John F. | Radiation Study Section | 1990-92 |
| Ward, Dr. Paul H. | Communicative Sciences Study Section | 1970-71 |
| Ward, Dr. Peter A. | Pathology A Study Section | 1976-78 |
| Warner, Dr. Homer R. | Computer Research Study Section | 1964-66 |
| Warner, Dr. Noel L. | Immunobiology Study Section | 1985-89 |
| Warner, Dr. Robert C. | Biochemistry Study Section | 1972-74 |
| Warnock, Dr. David G. | General Medicine B Study Section | 1989-91 |
| Warren, Dr. Andrew J. | Tropical Diseases Study Section | 1946-49 |
| Warren, Dr. James C. | Reproductive Biology Study Section | 1978-80 |
| Warren, Dr. Steven T. | Mammalian Genetics Study Section | 1994-96 |
| Watanabe, Dr. August M. | Pharmacology Study Section | 1981-83 |
| Waterman, Dr. Michael R. | Physical Biochemistry Study Section | 1989-91 |
| Waterson, Dr. Robert H. | Molecular Cytology Study Section | 1989-91 |
| Watterson, Dr. Daniel M. | Cellular Biology and Physiology Study Section | 1986-88 |
| Waugh, Dr. David F. | Biophysics and Biophysical Chemistry Study Section | 1960-63 |
| Way, Dr. E. Leong | Pharmacology A Study Section | 1968-70 |
| Weber, Dr. David J. | AIDS and Related Research Study Section 2 | 1994-96 |
| Weber, Dr. George | Experimental Therapeutics Study Section | 1976-78 |
| Weber, Dr. Gregorio | Biophysics and Biophysical Chemistry A Study Section | 1968-69 |
| Wechsler, Dr. Andrew W. | Surgery and Bioengineering Study Section | 1989-92 |
| Weil, Dr. John V. | Respiratory and Applied Physiology Study Section | 1983-85 |
| Weiner, Dr. Herbert | Mental Health A Study Section | 1966-67 |
| Weiner, Dr. Norman | Pharmacology Study Study Section | 1975-77 |
| Weiner, Dr. Richard I. | Biochemical Endocrinology Study Section | 1986-88 |
| Weiner, Dr. Roy S. | Clinical Sciences 1 Study Section | 1993-95 |
| Weingert, Dr. Martin G. | Allergy and Immunology Study Section | 1989-91 |
| Weiss, Dr. Martin H. | Neurology B Study Section | 1981-83 |
| Welch, Dr. Arnold D. | Pharmacology and Experimental Therapeutics Study Section | 1960-63 |
| Welch, Dr. Michael J. | Diagnostic Radiology Study Section | 1989-91 |
| Wender, Dr. Paul A. | Medicinal Chemistry Study Section | 1988-90 |
| Wenkert, Dr. Ernest | Medicinal Chemistry B Study Section | 1972-75 |
| Wesheim, Dr. Malden C. | Nutrition Study Section | 1983-85 |
| West, Dr. John B. | Cardiovascular and Pulmonary Study Section | 1973-75 |
| Westheimer, Dr. Gerald | Visual Sciences B Study Section | 1977-79 |
| Whalen, Dr. Robert E. | Cardiovascular and Renal Study Section | 1973-75 |
| Wharton, Dr. George W., Jr. | Tropical Medicine and Parasitology Study Section | 1960-61 |
| Whelan, Dr. William J. | Physiological Chemistry Study Section | 1973-75 |
| Whitaker, Dr. John N. | Neurology C Study Section | 1987-89 |
| White, Dr. Kerr L. | Health Services Research Study Section | 1962-66 |
| White, Dr. Sheldon H. | Human Development Study Section | 1980-82 |
| Whiteley, Dr. Helen R. | Microbial Chemistry Study Section | 1970 |
| Whitlock, Dr. David G. | Neurology B Study Section | 1966-70 |
| Wickner, Dr. William T. | Cellular Biology and Physiology Study Section | 1989-91 |
| Wicks, Dr. Wesley D. | Molecular Biology Study Section | 1978-79 |
| Wilhelm, Dr. A. E. | Endocrinology Study Section | 1957-60 |
| Willard, Dr. William R. | Child Health and Human Development Program-Project Committee | 1967-70 |

Appendix F (concluded)

| Chair | Study Section Name | Term |
|------------------------------|------------------------------------------------------|---------|
| Willerson, Dr. James T. | Cardiovascular and Renal Study Section | 1981-83 |
| Willey, Dr. Richard R. | Biomedical Communications Study Section | 1963-65 |
| Williams, Dr. Ned B. | Dental Study Section | 1957-58 |
| Williams, Dr. Robley C., Jr. | Biophysics and Biophysical Chemistry Study Section | 1958-60 |
| Williams, Dr. Robley C., Jr. | Biophysics and Biophysical Chemistry A Study Section | 1979-81 |
| Williams, Dr. Roger R. | Epidemiology and Disease Control Study Section | 1983-84 |
| Willis, Dr. H. Stuart | Tuberculosis Study Section | 1946-49 |
| Willis, Dr. William D., Jr. | Neurology B Study Section | 1970-72 |
| Wilson, Dr. J. Walter | Morphology and Genetics Study Section | 1949-54 |
| Wilson, Dr. Joe B. | Bacteriology and Mycology A Study Section | 1967 |
| Wilson, Dr. Joe B. | Bacteriology and Mycology Study Section | 1967-69 |
| Winegrad, Dr. Albert I. | Metabolism Study Section | 1974-75 |
| Wing, Dr. Rena R. | Behavioral and Neurosciences Study Section | 1988-91 |
| Winkler, Dr. Barry S. | Visual Sciences C Study Section | 1994-96 |
| Winn, Dr. H. Richard | Neurology B Study Section | 1985-87 |
| Winn, Dr. Henry J. | Immunobiology Study Section | 1982-85 |
| Wintrobe, Dr. Maxwell M. | Hematology Study Section | 1956-59 |
| Wise, Dr. Dwayne A. | Biological Sciences Study Section | 1989-90 |
| Wise, Dr. Phyllis M. | Biochemical Endocrinology Study Section | 1993-95 |
| Wogan, Dr. Gerald N. | Toxicology Study Section | 1976-79 |
| Wold, Dr. Barbara J. | Genome Study Section | 1992-94 |
| Wolf, Dr. Gerald L. | Diagnostic Radiology Study Section | 1987-89 |
| Wolkman, Dr. Alvin | Immunological Sciences Study Section | 1977-79 |
| Wood, Dr. Ronald M. | Visual Sciences A Study Section | 1972-73 |
| Wood, Dr. Ronald M. | Visual Sciences Study Section | 1971-72 |
| Woodhall, Dr. Barnes | Neurology Field Investigations Study Section | 1957-61 |
| Woodruff, Dr. William H. | Molecular and Cellular Biophysics Study Section | 1989-90 |
| Wook, Dr. Telford H. | Epidemiology and Disease Control Study Section | 1973-75 |
| Wortis, Dr. Sam B. | Mental Health Program-Project Committee | 1961-63 |
| Wright, Dr. Andrew | Microbial Physiology and Genetics B Study Section | 1992-94 |
| Wright, Dr. Ernest M. | Physiology Study Section | 1983-86 |
| Wright, Dr. Peter R. | Molecular and Cellular Biophysics Study Section | 1991-93 |
| Wylie, Dr. Wendell L. | Dental Study Section | 1955-56 |
| Yamamoto, Dr. Keith R. | Molecular Biology Study | 1987-90 |
| Yamamoto, Dr. William S. | Computer Research Study Section | 1966-67 |
| Yeager, Dr. James D., Jr. | Metabolic Pathology Study Section | 1993-95 |
| Young, Dr. James Harvey | History of Life Sciences Study Section | 1972-74 |
| Zee, Dr. David S. | Visual Sciences B Study Section | 1992-93 |
| Zimbrick, Dr. John D. | Radiation Study Section | 1980-82 |
| Zimm, Dr. Bruno H. | Biophysics and Biophysical Chemistry B Study Section | 1970-72 |
| Zuelzer, Dr. Wolf W. | Human Embryology and Development Study Section | 1970-72 |
| Zwislocki, Dr. Josef J. | Communicative Sciences Study Section | 1969-70 |

Glossary

| | |
|--------|--------------------------------------------------------------|
| ACC | Advisory Committee on Computers in Research, NIH |
| ADAMHA | Alcohol, Drug Abuse, and Mental Health Administration, DHEW |
| ADEP | Associate Director for Extramural Programs, NIH |
| ADERT | Associate Director for Extramural Research and Training, NIH |
| AGAS | Automated Grant Application System |
| AREA | Academic Research Enhancement Award |
| ASAP | Accelerated Solicitations to Award Process |
| ATT | Application Transfer Team |
| CDRB | Career Development Review Branch, DRG |
| CMR | Committee for Medical Research |
| CRISP | Computer Retrieval of Information on Scientific Projects |
| DCRT | Division of Computer Research and Technology, NIH |
| DGMS | Division of General Medical Sciences, NIH |
| DHEW | Department of Health, Education, and Welfare |
| DOD | Department of Defense |
| DRFR | Division of Resource Facilities and Resources, NIH |
| DRGF | Division of Research Grants and Fellowships, NIH |
| ECEA | Executive Committee on Extramural Affairs |
| EEO | Equal Employment Opportunity |
| EGAD | Electronic Grant Application Development |
| EPMC | Extramural Program Management Committee |
| ESRAC | Executive Secretaries Review Activities Committee |
| FAST | Federal Assistance Streamlining Task Force |
| FBI | Federal Bureau of Investigation |
| FIRST | First Independent Research Support and Transition Awards |
| FSA | Federal Security Agency |
| FTE | Full-Time Equivalent |
| GAO | Government Accounting Office |
| GMB | Grants Management Branch |

| | |
|-------|------------------------------------------------------------------------------|
| GPRST | Grants Peer Review Study Team |
| GSA | Government Services Administration |
| GTA | Grants Technical Assistant |
| IACEP | Intra-Bureau Advisory Committee for Extramural Affairs |
| IMPAC | Information for Management, Planning, Analysis, and Coordination (data base) |
| IRG | Initial Review Group |
| ISB | Information Services Branch, DRG |
| K-6 | Career Awards |
| LAN | Local Area Network |
| MERIT | Method to Extend Research in Time Awards |
| MIT | Massachusetts Institute of Technology |
| MHS | Marine Hospital Service |
| NACC | National Advisory Cancer Council |
| NAHC | National Advisory Health Council |
| NCI | National Cancer Institute |
| NDRC | National Defense Research Committee |
| NHLBI | National Heart, Lung and Blood Institute |
| NIH | National Institutes of Health |
| NIAMD | National Institute of Arthritis and Metabolic Diseases |
| NIGMS | National Institute of General Medical Sciences |
| NIMH | National Institute of Mental Health |
| NINDB | National Institute of Neurological Diseases and Blindness |
| NRC | National Research Council |
| NRC | National Resources Committee |
| NSF | National Science Foundation |
| OD | Office of the Director |
| OEP | Office of Extramural Programs, DHEW |
| OMB | Office of Management and Budget |
| OMP | Office of Management Policy, NIH |
| OPP | Office of Policy Planning, NIH |
| ORP | Office of Research Planning, NIH |

| | |
|------|----------------------------------------------------------------------|
| OSRD | Office of Scientific Research and Development |
| PPO | Policy and Procedure Office, DRG and NIH |
| R&D | Research and Development |
| RO1 | Investigator-initiated Research Project |
| R29 | FIRST award |
| RAEB | Research Analysis and Evaluation Branch, DRG |
| RAID | Random Access for Institutes and Divisions awards summary |
| RB | Referral Branch, DRG |
| RFP | Request for Proposal |
| RGO | Research Grants Office, NIH |
| RGRB | Research Grants Review Branch, DRG |
| RPC | Review Policy Committee, NIH |
| RPG | Research Project Grant |
| RRB | Referral and Review Branch, DRG |
| SAB | Science Advisory Board |
| SAB | Statistics and Analysis Branch, DRG |
| SATT | Science Base, Clinical Applications, Transfer, and Research Training |
| SBIR | Small Business Innovative Research Program |
| SE | Scientific Evaluation Grants |
| SRA | Scientific Review Administration |
| SRB | Scientific Review Branch, DRG |
| TBSS | Tuberculosis Study Section |

Guide to Sources

Documentary histories are only as good as their sources. For this study, we had available an extensive but discontinuous set of official DRG records, partially archived and partially held in administrative files. Official files for the years 1964 – 1985 could not be located and are presumably lost. Covering this lacuna is an overlapping field of records from the Office of the Director, NIH, together with several collections of oral history interviews held by the National Library of Medicine. The record system has preserved the basic extramural databank, at least for the time being. The Grant History File maintained on the IMPAC operational database, which is to be phased out in 1998, stores the transaction records for some 275,000 competing awards and 847,000 competing applications. NARA has accessioned the Division's Principal Investigator Files for 1938 – 1990. These massive holdings, which entail 282 linear feet and about 100,000 grantees, are currently untapped for historical purposes. They invite additional research efforts. The same cannot be said for the Advisory Committee meeting records held by the Library of Congress, Serials and Government Publications Division. Since 1973, DRG Study Sections have been required to file nominal reports of annual meetings with LC/SGPD, but the information categories reveal nothing substantial about the discussions and are useful only for attendance purposes.

The most useful in-house materials were the retired subject files of the Office of the Chief, DRG, for 1946 – 1964, an intact record set of about 24 cubic feet, which will be accessioned to NARA at the end of the project. Interchanges with congressional staff threw light on the origins of budgetary expansion in 1957, particularly on the role of Senator John F. Kennedy in publicizing grant funding shortfalls. "Daily Boards" and letter files of Chief Lindsay and his deputy, Dr. Richard Willey, are an invaluable time-slice of Division activities and decision issues in the early 1960s. There are also grants management audits, which reveal in

much detail the administrative trials of prominent grantees. After mid-1963, the official files have apparently been lost, except for remnants appearing in backfiles of the Executive Officer, James Pike, and Special Assistant John James. Inactive files of the Referral and Review Branch — particularly memos of the Chief and minutes of the meetings of the Executive Secretaries — explained much about the expansion of review services after 1976.

Another essential source for in-house records, the Office of the Director, NIH, Central Files, is currently being accessioned separately to NARA. Meeting minutes for the Institute Directors and the Director's Advisory Committee (Committees 2-3 and 2-4) contain authoritative policy discussions, often extended into organizational files (the Organization and Management 1-2 series), which need to be complemented with materials in type-related subject headings. The Program Planning files should be consulted for the operational framework of decisions. Subject headings of particular relevance to extramural activities and grant mechanisms can be found under classifications between Research 8-1 and Research 8-8. Files of other deliberative bodies participating in extramural management are Committees 2-1 (Advisory Councils) and Committees 2-7 (Executive Committee for Extramural Affairs).

National Archives holdings of NIH records (Record Group 443) contain the subject files of the Office of Research Planning for 1945 – 1956, a useful composite of legislative and scientific decisions issues with extensive backfiles at the WNRC facility in Suitland. The minutes and transcripts of National Advisory Cancer Council meetings (Entries 26 and 27) and the minutes of the National Advisory Health Council for 1945 – 1960 (Entry 12) have material bearing on the final stages of the transition to dual review in the late 1940s. The NIH "Organization File" has extramural administrative materials designated "RGO," generated before Division status was conferred in August 1946. Other RG 443 classifications germane to extramural affairs are the records of

the Gerontology Study conducted by DRG during 1946 – 1950 (Entry 45), minutes files of the National Advisory Mental Health Council and its review groups for 1946 – 1967 (microfilm), and the Division's Principal Investigator files from 1938 to 1990 (Entry 60).

One liberty taken with notation format should also be acknowledged. In the endnotes and bibliography, administrative serials — which circulated in-house only and were generally not available to the public — are cited with the title underlined rather than italicized. The most prominent here is DRG, Administrative Report, a mimeographed monthly circulated to executive secretaries, which needs to be distinguished from the more familiar DRG *Annual Report*, which had an extensive circulation outside the Division.

Selected Bibliography

Notational Abbreviations

| | |
|--------------|---------------------------------------------------------------|
| Acc. | Accession |
| BID | Bureau, Institute, or Division |
| Exec Secs | Executive Secretaries |
| GPO | Government Printing Office |
| <i>JHMAS</i> | <i>Journal of the History of Medicine and Allied Sciences</i> |
| NARA | National Archives and Records Administration |
| NLM/HMD | National Library of Medicine/History of Medicine Division |
| O1-6 | Outlines 1-6 |
| OC | Office of the Chief |
| OD | Office of the Director |
| OSG | Office of the Surgeon General |
| RG | Record Group |
| WNRC | Washington National Records Center |

Archival Collections

National Library of Medicine, History of Medicine Division

George Rosen Papers
Bess Furman Armstrong Papers
Wyndham Miles Papers
Lister Hill Papers

National Archives

RG 90, Records of the Public Health Service
Office of Research Planning, backfiles
Office of the Surgeon General, Correspondence
RG 227, Records of the Office of Scientific Research and Development
Committee on Medical Research, Minutes Files
OSRD Subject Files
RG 443, Records of the National Institutes of Health
Organizations File, 1930-1948
National Advisory Health Council, Minutes File, 1945-1960
Policy Committee on Fellowships, Minutes File, 1947-1949
Office of Research Planning, Subject Files, 1948-1956
Donald S. Fredrickson, Office Files, 1975-1981

Lyndon B. Johnson Library

Records of the Department of Health, Education, and Welfare
Administrative Histories

Operational Records

Office of the Director, NIH, Central Files

1948-1982 classifications

Buildings and Grounds 1, 9-2, 9-3

Committees 2, 2-3, 2-4, 2-7, 2-8-L

Data Processing 1-2

Financial Management 2

Organization and Management 1-2

Program Planning (General), 3 (Studies and Analyses)

Research 8 (General), 8-1-h, 8-1-i, 8-6

Research 9-3

1983-1987 classifications

Committees 2-8-1, 2-24, 2-25

Office Services 4-2-a

Organization and Management 2-n-2

Papers of William Goldwater, Office of Extramural Research

Minutes, Extramural Policy Management Committee

Minutes, Review Policy Committee

Division of Research Grants, Active and Inactive Files

Archives

Outline 1 1946-1951

Outline 2 1952-1955

Outline 3 1956-1958

Outline 4 1959-1960

Outline 5 1961-1962

Outline 6 1963-1964

Referral and Review Branch Historical Files, 1956-1985

Grants Information Office Historical File

Director's Files, 1985-1993

Deputy Director's Files, 1985-1993

Executive Officer's Files, 1976-1993

Papers of Harold Davidson

Minutes, Physiology Study Section, 1946-1960

Minutes, Surgery Study Section, 1946-1960

NIH Serial Record Sources and Document Collections

DRG, Administrative Report

DRG, *Advisory Committee Minutes*

DRG, *Annual Report*

DRG, Annual Report of the Study Sections (1948 only)

DRG *Digest*

DRG, *Keeping You Informed*

DRG Newsletter

DRG Peer Review Trends: Workload and Actions of DRG Study Sections, 1980-1990

DRG Study Section Trends: Characteristics of Applications and Study Section Actions, FY 1983-1992

NIH Almanac

NIH, Basic Data Relative to the National Institutes of Health

NIH, Biennial Report of the Director, NIH

NIH Data Book

NIH Record

PHS, Annual Report of the Surgeon General

Speeches and Articles by/on Dr. James A. Shannon. 4 vols.

Bethesda, MD.: Office of the Director, NIH, n.d.

Dr. Robert Q. Marston's Speeches and Articles. 4 vols. Bethesda, MD:

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| Eugene Confrey | 1/24/95 |
| David E. Price | 1/25/95 |
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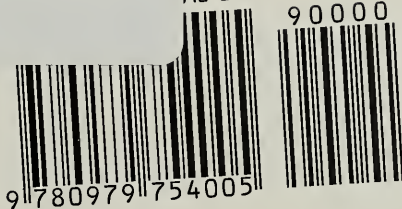


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